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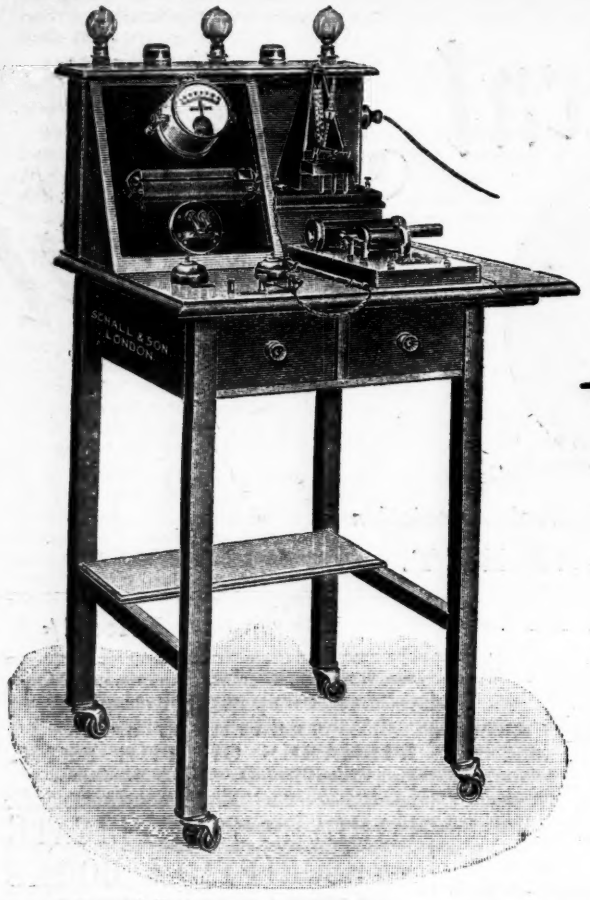

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DISAPPOINTMENTS AFTER GASTRO-ENTEROSTOMY.

BY

ROBERT HUTCHISON, M.D., F.R.C.P.,

PHYSICIAN TO THE LONDON HOSPITAL, ETC.

THE modern operation of gastro-enterostomy when performed for chronic ulcer of the stomach or duodenum is usually so satisfactory in its results that a surgeon is justified in promising the patient complete relief from his digestive troubles if he submits to it. All the greater, therefore, is the disappointment of both when the promised benefits do not follow and when the patient finds that he has not obtained that digestive peace to which he had looked forward. I propose to consider briefly the nature of some of these disappointments and to discuss their cause and how they may be avoided.

Persistence of Pain.

The chief symptom of ulcer is pain, and the most certain immediate result of a gastro-enterostomy is the disappearance of pain. In the great majority of cases the relief from pain is permanent, but in a few it returns after an interval of a few months or longer. The pain may be constant or it may occur in bouts and have the character of "hunger pain." Naturally the patient fears that his old ulcer has come back—although as a matter of fact this rarely if ever happens—and he goes to his doctor, who is apt to put him off with a diagnosis of "adhesions." Now it would be going too far to say that adhesions are never a cause of severe abdominal pain, but they are certainly not often so, and after gastro-enterostomy no adhesions should form. As a matter fact severe pain coming on some time after the operation should suggest the formation of an ulcer either in the jejunum or at the site of the anastomosis.

Jejunal ulcer seems most apt to form in those cases in which the gastric hyperacidity has persisted, as it sometimes does in spite of the operation. An anastomosis ulcer, on the other hand, is usually, I believe, the result of using unabsorbable sutures when uniting the stomach and jejunum. In either case the ulcer may heal temporarily under medical treatment by rest, diet, and bismuth, but permanent cure by such means is, I should think, rare, and operation is certainly the best remedy. So far as I have seen, it is usually quite satisfactory in its results.

Apart from fresh ulceration, pain recurring after gastro-enterostomy may be due to some condition outside the stomach which has been overlooked at the time of the operation or which has arisen since. Gall stones are a case in point. Most surgeons now make a point of removing the appendix when performing gastro-enterostomy, but if for any reason this has not been done, pain of appendicular origin may arise later and necessitate further operation. I have also seen one or two cases in which stone in the kidney appeared in patients who had undergone gastro-enterostomy. It should be remembered in this connexion that such patients are rather prone to phosphatic stone formation owing to the fact that they have often taken large quantities of alkalis for the relief of pain before the operation, and have had in consequence a condition of phosphaturia.

Pain may also persist if the operation has been unnecessarily performed in a case of acute ulcer or gastralgia. I have met with one example of this in a young woman in whom, when the abdomen was reopened in order to undo the gastro-enterostomy, no sign of a healed ulcer could be discovered.

Lastly, it would seem that an anastomosis between the stomach and jejunum predisposes to pain in the colon, perhaps from too rapid filling of it, perhaps from irritation by food which has been imperfectly digested higher up. At all events, pain of greater or less severity in the lower abdomen, and sometimes attended by looseness of the bowels, is not uncommonly met with in the earlier months after the operation, although it usually disappears later. In not a few instances also I have known mucous colitis appear in patients who had not been the subject of it before the operation, and this also, by reason of the entero-spasm which is so often associated with it, may be a cause of pain.

Vomiting.

As a cause of disappointment after gastro-enterostomy vomiting is less common than pain. In the early days of the operation it was all too familiar as the result of the establishment of a "vicious circle," but with the present methods of operating a "vicious circle" is almost never seen. One still meets occasionally, however, with patients who have pretty continuous vomiting, chiefly of bile. Such an occurrence points to some mechanical obstruction in the neighbourhood of the anastomosis, and, if washing out the stomach fails to relieve, surgical measures to deal with the obstacle are indicated.

Functional Disorder.

More baffling than either of the forms of disappointment already considered are those cases in which the symptoms point not to an organic (or surgical) lesion, but to a profound functional disorder of the alimentary tract. The operation may have relieved the patient of his devil of pain, but it has let in seven other devils which are almost as disagreeable tenants. The complaints of such patients are various: there is a "heavy" feeling or "distension" in the epigastrium, as if the stomach was "too big"; or again there is a sense of "emptiness," as if the food dropped "straight down"; distressing nausea, like "constant sea-sickness," is frequent; flatulence and regurgitation are also met with; and along with any of these symptoms there may be a feeling of great weakness and prostration, failure to gain weight, profound mental depression with nervous feelings and phobies of various sorts. No wonder that, when many of these symptoms concur, the patient is disappointed with the results of the operation. What is the cause of these untoward manifestations? It is not always easy to say. A test meal usually reveals diminished acidity, such as is common after gastro-enterostomy, and the *x* rays generally show that the stoma is acting well; sometimes, indeed, the stomach is emptying too rapidly, but in one or two cases within my experience it has been found that owing to dropping of the stomach the stoma is placed too high and stagnation in the lower part of the organ has resulted. This is specially apt to happen if the pylorus has been occluded at the time of the operation, and the delayed emptying, combined with a lessened acidity, is enough to account for much digestive discomfort.

One feature which is common to almost all the cases of functional disorder after gastro-enterostomy is diminished gastric tone. It is probable that this has been present in the majority even before the operation; but in some it may date from the operation itself. It is not sufficiently realized that the operation of gastro-enterostomy profoundly affects the gastric functions, both secretory and motor, and that it is not the simple drainage procedure sometimes pictured. Given an atonic stomach which also empties itself too fast, we get in an exaggerated degree that sensation of sinking and emptiness which is so characteristic a symptom of ordinary gastric atony.

The effects of too rapid emptying of the stomach are aggravated by a consequent overfilling of the intestine which is often accompanied by some ileal stasis, as revealed by the *x* rays. In two of my cases stagnation had been carried so far that part of the jejunum beyond the anastomosis had become dilated so as to form, as it were, an accessory stomach, as if to compensate for the practical abolition of the true stomach as an organ of digestion.

Glycosuria.

An interesting symptom of which I have met with three examples amongst the cases now under consideration, is glycosuria. How this is produced it is difficult to say. It has been small in amount and apparently not much influenced by diet. In at least one case it disappeared after the anastomosis had been undone.

TREATMENT.

What can be done for patients who exhibit these symptoms? Not very much, unfortunately, but considerable relief is experienced from the wearing of an efficient abdominal support with a diet consisting of small dry meals and rest in the recumbent position after food. Abdominal massage has a good effect upon the ileal stasis. Drugs are not of much help. In at least four cases the discomfort was so great that I was obliged to advise that

the anastomosis should be closed. One is naturally reluctant to recommend such a step, but so far as I have seen the results have always justified it. The constant nausea, which was a prominent symptom in all of them, was got rid of, and, although none of the patients was restored to perfect health, they were all greatly relieved and brought back to a condition of comparative efficiency.

The moral to be drawn from these disappointments is that cases for gastro-enterostomy should be selected with greater care than is always exercised, and the opinion of a physician as to the advisability of the operation should be obtained as well as that of a surgeon. Even with the greatest care mistakes in diagnosis will occur, but the surgeon should have the moral courage to close the abdomen and proceed no further if at the time of the operation no definite organic lesion of the stomach or duodenum can be demonstrated. In some of the cases I have seen there was strong reason to suspect that the operation had been performed for atonic dilatation or gastroptosis only; the results are always bad. Even when an organic lesion is present the coexistence of decided atony of the stomach is a contraindication to operation unless careful and prolonged medical treatment has failed to relieve.

The Lumleian Lectures
ON
CEREBRO-SPINAL FEVER.

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON,
BY
SIR HUMPHRY ROLLESTON, K.C.B., M.D., F.R.C.P.,
EMERITUS PHYSICIAN, ST. GEORGE'S HOSPITAL; PRESIDENT, ROYAL SOCIETY OF MEDICINE.

LECTURE II.

(Abstract.)

IN his second lecture Sir Humphry Rolleston gave a clinical picture of the disease. The incubation period has been variously stated to be from one day up to as long an interval as thirty days, most writers inclining to a period of four or five days, and very few regarding it as long as ten days. These estimates have been based on the interval between known contact with a case or a recognized carrier and the appearance of symptoms, but a more accurate basis for deciding the incubation period would be provided by determining the average duration of the period that meningococci are present in the naso-pharynx before symptoms of systemic infection appear. Fildes and Baker examined with a negative result 26 men who subsequently contracted the disease, concluding that carriers seldom develop the disease, and that the period of time between the acquisition of the meningococcus and the onset of the disease must usually be short. Out of these 26 cases, 5 were examined within a week of the onset, 8 during the second week, and 4 in the third week before the onset.

The general opinion, as voiced by von Lingelsheim, Gordon, and Andrewes, is that meningococci are constantly present in the throat at the onset of the disease, and that every case arises in a carrier. Fildes and Baker's observations, as far as they go, are certainly compatible with this view that the incubation period is very short, and need not be more than a day or two, but their failure to find any meningococci in the throats of persons who afterwards contracted the disease is exceptional, for other observers with much smaller series of cases have usually been able to point to some examples of known carriers contracting the disease; thus, among Martin Flack's 185 carriers 4 developed the disease during isolation.

ONSET.

The usual form is much like that of ordinary "influenza," and is sudden, with headache, fever, and vomiting, the symptoms becoming progressively worse, so that in twenty-four hours meningitis is suggested. Sometimes after this form of onset the symptoms rather suddenly advance, so that in a short time—an hour or two—the patient is comatose or delirious; in young children, and occasionally in adults, the onset may be marked by convulsions. On the other hand, after the onset there may be a fallacious improvement for a day or two, as if the blood invasion were yielding to the forces of natural immunity, and then meningitic symptoms appear. The catarrhal onset lasting some days is more gradual.

The acute or fulminating onset is the least frequent; it may take various forms. It may be maniacal, imitating delirium tremens, attended by convulsions suggesting epilepsy, by hallucinations or syncope, or the patient may be unconscious when first seen. In patients found unconscious, or in the apoplectic mode of onset, the diagnosis is obviously very difficult; in some instances the patient has fallen out of bed or out of his hammock, and the question of fractured base has arisen. This apoplectiform onset may be rapidly followed by death, and thus accounts for cases of sudden death unexplained until examination after death shows the presence of the meningococci in the central nervous system.

With severe haemic infection the manifestations are those of grave toxaemia, approaching the typhoid state, often at the outset with a subnormal temperature, which subsequently rises rapidly, quick pulse and respirations, vomiting, and a haemorrhagic rash. Sudden cardiac collapse and fatal syncope at the onset of meningitis are specially described by Sainton. The initial shock may be considerable, and when accompanied by vomiting, abdominal pain, and diarrhoea, may suggest an acute abdominal lesion such as appendicitis or perforation, and laparotomy has naturally been performed. One such case in the navy was operated upon for a supposed perforated gastric ulcer and found to have a normal abdomen; at the suggestion of the anaesthetist, lumbar puncture was at once performed, and turbid fluid containing meningococci obtained.

CLINICAL FORMS.

Cerebro-spinal fever, like acute poliomyelitis, has two distinct phases: (*a*) The general or systemic infection; and (*b*) the localization in the meninges. The evidence of systemic infection is usually prominent in the initial stages, and the process is then commonly extremely acute, but it may continue for weeks, and in rather rare instances chronic septicaemia follows meningitis.

A most important factor influencing the course and type of the disease is the serum treatment. Absence of or inefficient serum treatment is responsible for fatal results either early in the disease or after a chronic illness due to adhesions or chronic septicaemia. The different types of cerebro-spinal fever show transitional forms, and description of the forms is apt to be artificial and confusing, as a single case may appear to belong to two. Further, the clinical picture of the disease is often abruptly changed by unexpected alterations, such as improvement or the onset of grave symptoms. The following forms of cerebro-spinal fever may be briefly mentioned without a detailed description, and to avoid repetition the symptoms will be mainly dealt with subsequently: (1) Fulminating; (2) ordinary acute; (3) abortive; (4) chronic: (*a*) septicaemic; (*b*) encysted or loculated meningitis.

The posterior basic meningitis of infants is chronic encysted meningococcic meningitis in young infants, and its special features appear to depend on the early age of the patients rather than on any peculiarity in the infecting organism. More than twenty years ago Still showed that the disease was due to a micro organism almost identical with the meningococcus, and of late years it has become recognized that there is no constant bacteriological distinction between the meningococcus of posterior basic meningitis and that of cerebro-spinal fever in later life. But Andrewes states that serologically the meningococci may be of a different strain from those of the epidemic disease in adults, and M. H. Gordon states that the meningococci in posterior basic meningitis do not differ serologically from those in adult cases, except that some, which are more difficult to identify, are usually atypical specimens of his Group IV. Among the cases called posterior basic meningitis half occur under six months of age, three-quarters within the first year, and practically all under the age of two years, but there is no essential difference between the condition of closed meningococcic infection of the cerebral ventricles in infants and in adults. It may be well to mention the main clinical features differentiating the clinical form called posterior basic

meningitis from ordinary cerebro-spinal fever in adults: 1. The chronicity of the disease, for acute cases of meningococcic meningitis do not come under this heading. 2. The rarity of eruptions; among Hildesheim's 100 cases there was no example of a purpuric rash and herpes was present in two cases only. An ill-defined erythema occurs in a few cases. 3. Amaurosis or loss of vision without objective changes in the retina or optic nerve is common; it was noted in 37 out of Hildesheim's 100 cases. 4. The rarity of deafness and the occasional presence of auditory hyperacuity. 5. The prominence of opisthotonos, due to the greater flexibility of the spinal column. 6. Joint infection appears to be usually periarthritic rather than intra-arthritic, and may be associated with pseudo-glioma or the opacity of the vitreous caused by meningococcic invasion and imitating a glioma.

Mixed and Secondary Infections.

In addition to the meningococcus the cerebro-spinal fluid may show various micro-organisms, such as the tubercle bacillus, the pneumococcus, the influenza bacillus, streptococci, and staphylococci. Among 339 cases in the navy there were 8 of this kind, 4 with streptococci, 3 with pneumococci, and 1 with tubercle bacilli; such cases are, of course, usually fatal, and recovery occurred in one case only, with pneumococcic infection present at the first lumbar puncture.

The commonest secondary infection appears to be pneumococcic; and it would appear that secondary pneumococcic infection depends mainly on the virulence of the pneumococcus, for in a previous series of 300 cases of meningococcic meningitis Netter and Salanier found four cases only of secondary pneumococcic infection.

Fitzgerald, who reports 12 cases of meningococcic meningitis, three of which were also infected with pneumococci, suggests that this secondary infection is commoner than is usually recognized, and quotes Mervyn Gordon's opinion that it occurs in 5 per cent. of the cases. He points out that unless the lumbar puncture fluid is bacteriologically tested on each occasion cases may easily be missed, and thus the real reason for ascribed failures of serum treatment be undetected. All the reported cases of combined meningococcic and pneumococcic infection, with the exception of three recorded by Netter and Salanier, proved fatal. Combined tuberculous and meningococcic infection of the meninges is very rare. Of the recorded cases Bériel and Durand accept eight only.

Streptococcic infection may spread from the lumbar puncture wound, be due to otitic infection, or arise without any obvious focus of infection.

Rashes.

The incidence of rashes varies in different epidemics; thus, in one of the earliest accounts of the disease North says that haemorrhages, which in 1806–7 marked almost every case, were rarely observed in 1808–9. Writing in 1911, Netter and Debré stated that eruptions have been, generally speaking, commoner in Britain and America than in Germany, and especially in France. In the years before the war rashes were very rare in sporadic cases in adults and were hardly ever seen in children, but during the increased prevalence since 1914 rashes have been common; thus, among 502 cases in the Royal Navy during the first four years of war there were 296, or 59 per cent., with rashes. In France also purpura has become more frequent during the war, and Netter has suggested that this may be correlated with Dopter's observation that whereas before the war the infecting strain of meningococcus was in 96 per cent. of cases Type A (Gordon's I and III), during the war Type B (Gordon's II and IV) has become equally if not more important, and that the increased frequency of meningococcaemia is also thus explained.

Among 277 cases Netter had 19 of meningococcic purpura without meningitis, and states that it has become commoner, and that as bullae can be raised by friction over the purpuric areas more easily than in other forms, this may be utilized to determine the strain of the infecting organisms and so enable the corresponding serum to be selected.

Varieties of Rashes.

The cutaneous rashes accompany or closely follow the onset of the disease. They are seen on the first or second day of the disease and are comparable to the rose spots of enteric fever. There is almost always an interval of two to three days between the appearance of the initial rash and of labial herpes in cases which show both.

The characteristic rash is haemorrhagic, and may be either small and petechial, resembling that in malignant endocarditis, or purpuric like that in the malignant forms of the exanthemata and acute lymphocytic leukaemia. The rash may be petechial or purpuric from the start, or the petechial character may supervene on an erythematous, papular, rose-spot, macular, or blotchy eruption. The erythematous rash has been described as transient and is seldom recorded. Occasionally the initial rash is described as urticarial.

The rose spots, papules, and petechiae are presumably embolic and evidence of the stage of septicaemia or blood invasion. They are more prone to occur in parts exposed to friction, especially the joints; in some instances the haemorrhagic eruption may be partly vesicular, in others bullae may form over purpuric areas, and in one such case in the navy a pure culture of meningococci was obtained from the fluid. In rare instances ulceration may supervene in large haemorrhagic areas, and yet recovery follow. Trophic bullae may form on various parts of the body, such as the fingers, and, according to Fairley and Stewart, are sterile. These observers divide the rashes into (1) primary — namely, the purpuric, petechial, and macular, due to septicaemia; and (2) the secondary, which do not appear until after the third day of the disease and are regarded as toxic.

Herpes.

Herpes is a well-recognized event in cerebro-spinal fever and may be considered under the two heads of (1) ordinary febrile herpes labialis, and (2) herpes of the zoster type.

Herpes labialis appears to occur with varying frequency in different epidemics, and the relative incidence of herpes labialis and of other cutaneous eruptions shows similar fluctuations; from a review of the literature up to 1898, Councilman, Mallory, and Wright concluded that herpes is far commoner than any other eruption. Netter found that herpes occurred in a third of his cases, and was more frequent than purpura, and Sainton states that it was present in two-thirds of his cases. On the other hand, Stillé says that in the Massachusetts epidemic herpes was infrequent, and much less often present than cutaneous rashes; in 502 naval cases there were 117, or 23 per cent., with herpes, and 296, or 59 per cent., with rashes.

Labial herpes appears later than the initial rash, and usually on the fourth day of the disease, but it may occur earlier, on the second day, or be postponed until later. In rare instances it may recur during continued fever, with a recrudescence of symptoms, or with the appearance of some complication. It is unusual in children, and exceptional in infants.

The causation of ordinary herpes labialis is undecided; it is not generally thought to be associated with any lesion of the central nervous system, though Howard, from histological examination of the Gasserian and other ganglia, considers that the herpes of pneumonia and cerebro-spinal fever has a similar anatomical basis to that of herpes zoster. Though frequently looked for, meningococci have very seldom been isolated from the vesicles of labial herpes. It has been suggested that the vesicles are due to meningococci, and their situation determined by inflammation of the Gasserian ganglion. As herpes labialis has been seen in persons reacting vigorously to prophylactic antimeningococcic vaccines it appears reasonable to refer it to the local action of toxins rather than of bacteria in the skin.

Herpes of the zoster type occurs in cerebro-spinal fever, but much less often than labial herpes. The two forms may be present at the same time; thus labial herpes and herpes of the external ear due to inflammation of the geniculate ganglion of the facial nerve, or labial herpes and herpes of the neck may be combined.

Nervous Symptoms.

Nervous symptoms are predominant at the onset of meningitis; severe headache, vomiting, and mental stupor or delirium are usually present, and there may be wild mania, symptoms suggesting delirium tremens, or epileptic

seizures. The mental disturbances during the septicaemic stages, and before meningeal infection has occurred, are probably toxic, and comparable to those at the commencement of other acute infections, such as pneumonia. Incontinence of urine and faeces is common. Swallowing may be difficult, either from oesophageal spasm or paresis, and is probably more frequent than the notes of cases show. Among the 502 naval cases it was mentioned in 8 (5 fatal). In a case recorded by McConnell, Morris, and Seehorn oesophageal spasm was so obstinate that gastrostomy was done, death following twelve hours later. General hyperaesthesia is not uncommon.

The condition of the *reflexes* varies; the deep reflexes are often exaggerated and an extensor response may be present; among 398 naval cases Babinski's sign was noted in 35, or 8.8 per cent.; it may be obtained on one side only. Herrick insists that whereas in other acute infections the deep reflexes may be equally exaggerated on the two sides, in cerebro-spinal fever there is a notable inequality. Kernig's sign and rigidity of the neck are practically constant when meningitis has appeared, and are so well known that they will not be further discussed here.

Facial paralysis is rare; it appears early and is transient. Among 502 naval cases it was recorded in 7, but among Robb's 230 cases there were 11 examples.

Paraplegia.

Paraplegia is rare; among 502 naval cases it was noted in 1; among more than 400 cases MacLagan found it in 3, 2 of which recovered; there was one example among Robb's 230 cases, and none among 120 cases that recovered and were analysed by Worster-Drought. It may be either organic or, in very rarely recognized instances, functional.

Organic paraplegia is described by Sophian as being either (1) spastic, with ataxia, clonus, extensor plantar response, no sensory changes, and no vesical disorder; (2) flaccid, with absence of reflexes and sensory changes. Of the spastic form Sophian has seen 12 cases, presumably due to the pressure of exudate around the cord some way above the cauda equina. The general experience is that the paraplegia slowly improves, but in some instances it is permanent.

Functional Paraplegia.—In convalescents the gait is naturally at first impaired, and as the patients may be unduly susceptible to auto-suggestion hysterical paraplegia may result.

Hemiplegia: Monoplegias: Nerve Deafness.

Hemiplegia is rare, and, like paraplegia, may be organic or functional. Among the 502 naval cases it occurred in 12, 10 of which proved fatal. Robb found 4 cases of hemiplegia among 230 cases at Belfast.

Monoplegias of the limbs due to inflammation of the nerve roots (radiculitis) as they pass through the meninges are described by Netter and Debré. They are even rarer than hemiplegia, occur earlier, are accompanied by wasting, pain, loss of reflexes and of sensation, but they usually disappear. Some only of the muscles of the limb may be affected. Sophian, however, states that monoplegias occur late in the course of the disease.

Nerve deafness is not nearly so common now as it appears to have been formerly. Deafness may also be due to otitis media, which is not a commonly recognized complication of cerebro-spinal fever; among 502 naval cases it was noted in 10. But some writers state that a mild form of otitis media is very common.

OCULAR SIGNS AND SYMPTOMS.

The *pupils* are usually dilated, due to irritation of the sympathetic, and when sluggish in addition point to increased intracranial pressure.

Photophobia, said to be rare, and thus to contrast with its frequency in tuberculous meningitis, was reported in 52, or 10 per cent., out of 502 naval cases, and was almost always an initial symptom.

Conjunctivitis is not very common; it occurred in 5.6 per cent. of 502 naval cases, in 10 (or 9 per cent.) of Councilman, Mallory, and Wright's 111 cases, in 15 (or 20 per cent.) of Ballantyne's 73 cases, and in 20 per cent. of Fairley and Stewart's series. The pus may, but does not always, contain meningococci. Conjunctival haemorrhages are sometimes present, and are important diagnostically, as they are practically never seen in other forms of meningitis.

Panophthalmitis is rare and is commonly unilateral; Levy (of Essen) had the exceptional experience of seeing 9 cases, 8 unilateral, among 165 cases of the disease. Among the 502 naval cases it occurred in 7, or 1.4 per cent., and was bilateral in 2 and unilateral in 5, all on the right side; in this connexion attention may be drawn to Netter's suggestion that the position of the patient's head, on the right or left, determines the side on which unilateral panophthalmitis occurs. As long ago as 1867 S. Gordon noticed the predominance of these infective conditions in the right eye.

Optic Neuritis and other Nerve Lesions.

Optic neuritis is usually regarded as infrequent and thus contrasting with its incidence in tuberculous meningitis; it seems to be specially related to septicaemic infection.

True *nystagmus* occurs in severe cases only, and by Fairley and Stewart is regarded as pathognomonic of internal hydrocephalus, and therefore of extremely grave prognosis. It must be distinguished from pseudo-nystagmus or jerky movements at the limit of fixation, which, according to Ballantyne, are without significance.

Strabismus, usually due to implication of the sixth nerve, is much less frequent than in tuberculous meningitis, and is usually transient.

Ptosis is much less frequent than strabismus; out of the 502 naval cases it was noted in 18, or 3.6 per cent., but 13, or 72 per cent., of these 18 cases terminated fatally. The mortality was thus 20 per cent. higher than in the squint cases; this may be correlated with the probable spasmodic nature of many of the squints and the paralytic origin of the ptoses.

Retraction of the upper eyelids may occur; among 73 cases Ballantyne noted it in 15, one of which also showed von Graefe's sign.

CIRCULATORY SYMPTOMS AND COMPLICATIONS.

Pericarditis is probably often latent, as it is found after death when previously unsuspected—an experience familiar in other conditions. Netter and Debré speak of pericarditis as a phenomenon almost confined to the *post-mortem* table, and some authors do not refer to it. Robb, however, noted pericardial friction in 17, or 7.4 per cent., out of 230 cases.

Endocarditis is probably not so rare as it has been stated to be, but the vegetations may be small and possibly are sometimes overlooked.

Phlebitis in the lower extremities has been reported in rare instances.

The *blood* shows a polymorphonuclear leucocytosis of from 20,000 to 50,000, and, according to Koplik, is over 25,000 in more than half the cases; in chronic cases the leucocytosis may fall to normal.

Pulse and Blood Pressure.

The *pulse* is usually regular, though it may, especially in grave cases, be irregular. Like the temperature, the pulse rate may vary greatly within a short time. The outstanding feature about the pulse is that it is so often slow in relation to the temperature; thus, in a naval chaplain who was maniacal in the early stage the temperature was 105° F. and the pulse 60. The slow pulse depends on vagal inhibition due to increased intracranial pressure. In fulminating and septicaemic cases the pulse is rapid, as in most other acute infections. Before death the pulse may become extremely rapid.

The *arterial blood pressure* is low in the septicaemic stage, and in the worst cases may be impossible to record, rises with the increased intracranial pressure accompanying the onset of meningitis, and may then be between 140 and 190 mm. Hg, and in internal hydrocephalus is almost always raised from pressure of the cerebro-spinal fluid on the floor of the fourth ventricle. During convalescence the blood pressure is, in the absence of complications, normal or subnormal. The *tache cérébrale* is usually well marked, but is not of any diagnostic value. Epistaxis is occasionally seen.

Temperature.

The temperature is very irregular and does not conform to any rule; probably every case has fever at some time

during the course of the disease, but some charts show little or no elevation of the temperature. There may be extreme oscillations at very short intervals—a feature of some diagnostic value in the early stages, according to Netter.

Complications in Thorax and Alimentary System.

Pulmonary complications in this country since the war have not been very common; bronchitis and broncho-pneumonia have been the most frequent and important.

Pleurisy may, of course, accompany pneumonia or bronchopneumonia in the course of cerebro-spinal fever, but it may occur without any obvious lung lesion; this occurred in 3 out of 502 naval cases.

Parotitis is rare; it may be due to an ascending infection from the mouth, as in other fevers and conditions in which the mouth is dry.

In the most severe cases there may be blood in the vomit and faeces, but rarely in considerable quantities. Diarrhoea is not uncommon as an initial symptom, and, as mentioned elsewhere, abdominal symptoms may be so prominent as to suggest an acute perforation of the alimentary tract, appendicitis, or Henoch's purpura. Jaundice is quite exceptional, and one case of peritonitis is tabulated by Herrick.

Lesions of Joints.

Arthralgia, or pain in the joints like that of influenza, is common at the onset and in the early stage of the disease, but is often overshadowed by the more severe symptoms.

Arthritis, or more often synovitis, is a recognized complication of cerebro-spinal fever, and may occur in meningococcic infection without meningitis, and in such cases has sometimes been regarded as "peliosis rheumatica."

The incidence was estimated at from 10 to 15 per cent. by Sophian, and from 5 to 20 per cent. by Roger, but among 502 cases in the navy it occurred in 24, or 4.8 per cent., and among Fairley and Stewart's 323 cases in 23, or 7 per cent. Among 902 other cases there were 59 cases of synovitis, or 6.5 per cent. It is more often seen in adolescents and adults than in babies, thus recalling the incidence of synovitis in acute rheumatism; but when it does occur in babies the hands and feet are specially picked out, whereas in older patients the larger joints—the knees, wrists, and ankles—are usually attacked. In posterior basic meningitis Still found periarticular infection, the joint cavities being healthy in 4 out of 49 cases examined after death, and Osler, in his Cavendish lecture, said the lesions were generally periarticular.

Clinical Features of Joint Lesions: Prognosis.

The accounts of the clinical features of the joint lesions in cerebro-spinal fever vary; thus, by some writers the joints are said to be very painful, by others as tolerant of movement.

The prognosis as regards the condition of the joint is good; the early cases clear up rapidly and commonly without any necessity for the intra-articular injection of serum. Even suppurative cases may clear up after simple aspiration. Ankylosis, of which Roger records a case with implication of the hip and knee, is rare.

The chronic cases of meningococcic pyarthrosis may imitate gonococcic or tuberculous arthritis. When the synovitis occurs about the eighth day of the disease it may be difficult to decide whether it is meningococcic or the first sign of serum disease. For the treatment intra-articular injection of serum has been widely recommended, but most cases clear up with purely symptomatic treatment. Salicylates do not exert any influence on the synovitis, but aspirin relieves the pain.

Urinary Changes.

The urinary changes are not characteristic or of clinical importance.

Cystitis may occur, and the incidence of pyuria has varied in different outbreaks. *Pyelitis* was reported in 5 per cent. of the Texas epidemic by Sophian, who described meningococci in the urine, but general experience shows that meningococci are rare in the urine, and that cystitis and pyuria during the disease may be due to other organisms; polyuria is occasionally noted.

Albuminuria is not very common, and when present is usually small in amount.

Haematuria is not common; when it occurs it usually is an early complication, and is associated with a petechial or haemorrhagic rash; it is presumably associated with haemorrhages in the mucous membrane of the urinary tract, but is not so often seen in the fulminating cases with much purpura as might naturally be expected. Among the 502 naval cases it was noted in 4 only.

Glycosuria is rare and may be quite transient. It is stated to be less frequent than in tuberculous meningitis, in which it occurs late; Garrod and Frew found it in 15 out of 41 cases of tuberculous meningitis, but never in posterior basic meningitis. The glycosuria would appear to be nervous and central in origin, but more than this it is difficult to say.

Urobilinogenuria was recorded by Cazamian in three-quarters of his 113 cases; it was most intense at the onset and was as frequent in the non-septicaemic as in the septicaemic cases. *Indicanuria* is stated to occur in grave cases.

Epididymitis and Orchitis.

Epididymitis and orchitis are complications of cerebro-spinal fever, and the meningococcus has been obtained by puncture of the inflamed organ, but it is rarely mentioned in the textbooks.

It appears that both meningococci (Gordon's Types I and III) and para-meningococci (Gordon's Types II and IV) may be associated with orchitis and epididymitis; but it is interesting that Latham's cases were associated with Type IV, which seems particularly prone to cause septicaemic and metastatic lesions.

It is generally considered that the epididymitis and orchitis are septicaemic in origin. I have not any reference to cases in boys under the age of puberty. In about 10 per cent. of the cases the lesion is bilateral. Orchitis or epididymitis is almost always transient, subsiding without suppuration and not being followed by atrophy.

Relapses and Recrudescences.

There is some confusion between these two terms, and therefore some uncertainty about the frequency of true relapses.

Recrudescences, sometimes called intermittent relapses, or the return of symptoms before the patient has really recovered from the disease, are very common, and a patient may have several; among the naval cases one patient had 7, and Ker quotes 13 recrudescences.

True relapses are rare. Netter appears to draw the line between recrudescences and relapses at a month from the disappearance of symptoms, and reported 4, or 1.6 per cent., among 255 cases.

Late relapses at long intervals after the patient has been cured can hardly be distinguished from second attacks. These cases of second attack are very rare; it is noteworthy that one attack of meningococcic infection usually protects against another, and that, as Adami has pointed out, the meningococcus thus differs from the majority of pathogenic micrococci.

Diagnosis.

For the certain diagnosis of meningococcic meningitis bacteriological examination of the cerebro-spinal fluid for meningococci is necessary, and similarly in the pre-meningitic stage of cerebro-spinal fever a blood culture is essential. No doubt genuine cases of cerebro-spinal fever may be ruled out by failure of bacteriological methods to give positive results. But this error is probably much less than that which would result from the inclusion of cases diagnosed on clinical grounds, and in the latter event it would be difficult to know where to draw the line. Cases with meningitic symptoms and meningococci in the nasopharynx but not in the cerebro-spinal fluid, though often probably genuine cases, and, indeed, so regarded by Flack, are open to the criticism that they may be meningococcus carriers with meningitis or meningism due to some other cause.

No clinical manifestation is pathognomonic of meningococcic infection. A haemorrhagic rash, though highly suggestive of meningococcaemia, may be present in pneumococcic, streptococcic, and influenzal infections, and in malignant forms of the exanthemata, such as small-pox. From other forms of meningitis, such as tuberculous,

pneumococcic, otitic, influenzal, an undoubted diagnosis can be made only by lumbar puncture and examination of the cerebro-spinal fluid.

As *lumbar puncture* is such an essential element in the diagnosis, it is well to insist that the risk of any harm from diagnostic puncture, provided the fluid is not withdrawn too rapidly or in excessive quantities, is almost negligible; some haemorrhage may occur, but this seldom causes serious damage.

The risk of introducing infection and setting up meningitis by diagnostic puncture may be practically dismissed, and is quite different from the danger of infection from repeated tappings.

Although it is simple enough to depend for the diagnosis of meningococcic meningitis on the examination of the cerebro-spinal fluid for meningococci, there are a number of cases in which a decision is still left in doubt. Cases certainly occur about which the purely clinical diagnosis appears unquestionable, but in which the cerebro-spinal fluid, though turbid from the presence of polymorphonuclear leucocytes, does not contain any micro-organisms. The occurrence of cases with a sterile polymorphonuclear fluid at the first lumbar puncture recalls Hort's contention that the meningococcus is only one of the phases in the life-cycle of the virus, and raises the unorthodox suggestion that in some of the phases the organism may be a filter-passer.

These cases should be treated, although they cannot be tabulated, as meningococcic; recovery is in favour of a meningococcic origin, not only from the point of view of this therapeutic test, but also because other forms of polymorphonuclear meningitis are usually fatal, recoveries in pneumococcic meningitis being most exceptional.

As already mentioned, the cerebro-spinal fluid, though characteristically polymorphonuclear, may, particularly in chronic cases, show a predominance of lymphocytes, and so resemble the cytology of the meningitis of tuberculosis, syphilis, mumps, malaria, acute lead poisoning, and of the meningitic form of acute poliomyelitis. Incidentally, some of the clinical differences from tuberculous meningitis have been referred to, and with regard to the others, though it is an interesting academic study, lumbar puncture will always be necessary, and more rapidly and surely decide the diagnosis and prognosis.

Meningism may be due to such a large number of acute infections that it would take too long to detail them. In particular, the lecturer mentioned pneumonia, otitis media, influenza, malaria, and salvarsan injection in this connexion.

Discussing the differential diagnosis, the lecturer mentioned tonsillitis, measles, rubella, rheumatic stiffness of the neck, and rheumatic fever as possible causes of difficulty.

Spirochaetosis ictero-haemorrhagica may cause meningitis, and in some of these cases there may be little or no jaundice.

In the *acute infective polyneuritis* described by Bradford, Bashford, and Wilson, the initial symptoms of headache, vomiting, pain in the back, and moderate fever, are in rare instances sufficiently severe to suggest the possibility of cerebro-spinal fever, but lumbar puncture shows that there is not any meningitis. *Anthrax* with cerebral symptoms may imitate meningococcic meningitis.

The meningitic form of Acute Poliomyelitis.—Clinically the resemblance to cerebro-spinal fever is very close; thus in 1911 Reece found that a reputed outbreak of cerebro-spinal fever was really one of acute poliomyelitis without any admixture of meningococcic cases.

Encephalitis lethargica, when first seen in Paris and elsewhere, was thought to be meningococcic meningitis until lumbar puncture put this diagnosis out of court. The cerebro-spinal fluid is clear and the cell content usually normal; if there be any cytological change it is in the direction of a lymphocytosis. Another difference from meningococcic infection is the absence of a haemic leucocytosis. The striking features of the disease—lethargy and ocular paralyses, though the latter are not constant—should arouse suspicion.

Uraemia may be suggested by fulminating cases in an unconscious condition, especially as there may be albuminuria, or from collapse, suppression of urine, and a petechial rash which might be thought to be uraemic. In pregnant women convulsions during cerebro-spinal fever have been regarded as eclamptic.

The purpuric eruption of the fulminating and acute cases may lead to confusion with fulminating and other forms of *purpura*, such as acute lymphocytic leukaemia, streptococcic septicaemia, Henoch's purpura, and the diagnosis may be cleared up only after death. *Haemorrhagic smallpox* occurring in connexion with cerebro-spinal fever may be regarded as the meningococcic infection. In the past the disease appears to have been confused with *malignant measles*, for in 1867 Gordon stated that haemorrhagic measles always accompanied cerebro-spinal fever.

Typhus, severe food poisoning, and acute osteomyelitis were also considered.

HOW TO READ STATISTICS.

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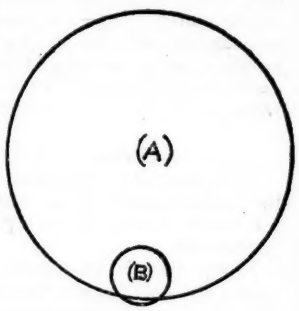
IT is a common but erroneous saying that statistics can prove anything; invaluable logical deductions can be drawn from complete statistical tables, but the conclusions drawn from incomplete tables are always fallacious. Every week one sees from insufficient data conclusions airily drawn that convince the simple reader; even the masters of the profession fail in this way: Gowers pointed out that among the lower classes 80 per cent. of the tabetics have been infected with syphilis, and therefore the preponderating cause of tabes was syphilis. Many people are so overwhelmed with a bald statistical statement of this sort that they seem to lose all their reasoning power. A moment's thought will show that the only logical conclusion that can be drawn from such a bald statement is that some syphilitics suffer from tabes. It is quite probable that less than 4 per cent. of syphilitics get tabes. It is not my intention to dispute the relation of tabes to syphilis, but to show what data are required before any association between two attributes can be inferred from statistical evidence.

Suppose that the following statement is made, and that it is known to be true of a certain assemblage: "99 per cent. of those who had red hair were Canadians." How many are apt to infer from this that the majority of Canadians had red hair! But a little thought will show that from the premiss it is impossible to say whether there is any association between Canadians and red hair; it is quite possible that 99 per cent. of the Canadians there had not red hair, as will be easily seen from the adjoining diagram.



Let the number of Canadians present be represented by the larger circle (A) and the number of those with red hair by the smaller circle (B). Let (N) denote the total number of observations, or in this case the total number of inhabitants in the place considered, say (N) = 12,000. Let capital letters denote the attributes to be investigated—for example, A denotes Canadians, B red hair. Further, let the number of those who possess the attribute of A, or the "class-frequency" of A, be denoted by (A); that is, let the class-frequency of an attribute be denoted by the attribute symbol enclosed in brackets. Similarly, let the class-frequency of the "not-A's" be denoted by (a), the corresponding small letter enclosed in brackets. Now suppose that the following five class-frequencies are given:

$$(N) = 12{,}000$$
$$(A) = 11{,}880 \quad \text{and} \quad (B) = 100$$
$$(a) = 120 \qquad (b) = 11{,}900$$

Of course it is always true that $(N) = (A) + (a) = (B) + (b)$, so that two of these data are redundant. For instance, if (A), (a) and (B) are given, (N) can be obtained by adding $(A) + (a)$; and (b) by finding the difference $(N) - (B)$. The above data are not sufficient to enable one to draw any conclusion as to the association of Canadians and red hair. For that we must know either how many Canadians have red hair—that is, the class-frequency (A B), or the class-frequency $(A\,b)$, or some other associated class-frequency such as $(a\,b)$.

Whenever two attributes are being investigated, 2^2 or 4 *independent* class-frequencies must be given in order that a valid conclusion may be drawn. It is well to remember that if n attributes are under consideration, valid conclusions as to their association can only be drawn when 2^n independent class-frequencies have been given. This point, if remembered, will prevent much waste of time in reading so-called statistical evidence which does not give the required number of independent class-frequencies.

To return to our original problem, whether there is any association between the attributes of red hair and Canadians, we must have 4 independent data. Suppose that they are—

$$(N) = 12{,}000,\ (A) = 11{,}880,\ (B) = 100,\ (AB) = 99.$$

From these data we can at once deduce the other five class-frequencies that are implicitly involved in these data; for the class (A), for instance, is composed of those that have red hair (AB) and of those that have not red hair (A b), so (A) = (AB) + (A b), and similarly (B) = (AB) + (aB).

All the nine class-frequencies can be arranged in a table like the following, where the attributes are placed above and on the left side, and the unassociated classes are denoted by their appropriate symbols in brackets.

	A	a		
B	99	1	100	(B)
b	11,781	119	11,900	(b)
	11,880	120	12,000	(N)
	(A)	(a)		

Now in order to determine the association, if any, that exists between Canadians and red hair, we must compare the proportion of the Canadians among those with red hair with that of the Canadians among those who have not red hair. Thus:

$$\frac{(AB)}{(B)} : \frac{(A\,b)}{(b)},\ \text{or}\ \frac{99}{100} : \frac{11{,}781}{11{,}900},\ \text{i.e.,}\ \frac{99}{100} : \frac{99}{100}.$$

Or we may compare the proportion of those with red hair among the Canadians with that of those with red hair among the non-Canadians:

$$\text{i.e.,}\ \frac{(AB)}{(A)} : \frac{(a\,B)}{(a)},\ \text{or}\ \frac{99}{11{,}880} : \frac{1}{120},\ \text{i.e.,}\ \frac{1}{120} : \frac{1}{120}.$$

Now whenever the ratios are equal (as in both the above examples) we may justly draw the conclusion that the attributes are entirely independent of each other in the assemblage considered.

It should be noted that the actual value of the ratio $\frac{(AB)}{(A)}$ or $\frac{(AB)}{(B)}$ alone gives no information; it must always be compared with its appropriate contrary ratio. Further, whenever $\frac{(AB)}{(A)} = \frac{(a\,B)}{(a)}$, it will also equal $\frac{(B)}{(N)}$. In the above case each of the first two ratios equals $\frac{1}{120}$ and $\frac{(B)}{(N)} = \frac{100}{12{,}000}$; and similarly when $\frac{(AB)}{(B)} = \frac{(A\,b)}{(b)}$, each of them will also be equal to $\frac{(A)}{(N)}$. Hence it will save some arithmetical work if the ratios $\frac{(AB)}{(A)}$ and $\frac{(B)}{(N)}$ or $\frac{(AB)}{(B)}$ and $\frac{(A)}{(N)}$ are first compared; if they are found equal, the two attributes are quite independent.

The legitimacy of this short cut can be shown by very simple algebra.

Let $\frac{a}{b} = \frac{c}{d} = k$; then $k = \frac{k(b+d)}{b+d} = \frac{a+c}{b+d}$

If $\frac{(AB)}{(A)} = \frac{(a\,B)}{(a)}$, each will be equal to $\frac{(AB)+(a\,B)}{(A)+(a)}$ or $\frac{(B)}{(N)}$.

It is most important to realize that no conclusion whatever can be drawn as to the relation between A and B, if only (A), (B) and (AB) are given; the total number of observations must be also given, or be determinable from other data. This will be clear after studying the following examples, in which (A) = 40 deaf persons, (B) = 50 blind, and (AB) = 2 who are both deaf and blind. The number (N) will be different in each example, and it will be found that the relation, or association, of deafness to blindness is different in each instance.

(1) Let (N) = 1000. Then

$$\frac{(AB)}{(A)} = \frac{2}{40} = 0.05,\ \text{and}\ \frac{(B)}{(N)} = \frac{50}{1000} = 0.05.$$

As the two ratios are equal, it is unnecessary to examine it further; we can at once draw the conclusion that in this assemblage blindness and deafness are quite independent of each other.

(2) Now let (N) = 10,000. Then

$$\frac{(AB)}{(A)} = \frac{2}{40}\ \text{or}\ 0.05,\ \text{and}\ \frac{(B)}{(N)} = \frac{50}{10{,}000}\ \text{or}\ 0.005.$$

This means that the proportion of the blind among the deaf in this assemblage is greater than the proportion of the blind among the whole population. In every case in which the ratios are unequal it is advisable to examine the relation more carefully—in this case to examine the ratio between the blind among the deaf, and that between the blind among those who are not deaf. In this way a more accurate degree of the association is obtained. We may make out a table as before:

	A	a		
B	2	48	50	(B)
b	38	9,912	9,950	(b)
	40	9,960	10,000	(N)
	(A)	(a)		

We see then that the proportion of the blind among the deaf is $\frac{(AB)}{(A)}$ or 0.05, but the proportion of the blind among those who are not deaf is $\frac{(a\,B)}{(a)} = \frac{48}{9{,}960}$ or 0.004819. In fact, among the deaf 5 per cent. are blind, while among the not-deaf less than 0.482 per cent. are blind.

Several methods have been suggested to define the measure of association. The following seems to me the simplest: When the ratios are equal the attributes are independent of each other, i.e., when the difference between the ratios is 0, there is no association. If now we multiply each ratio by the reciprocal R of the greater ratio, we shall not alter the relation of the ratios to each other, and the value of the greater ratio will become 1. If the association between the A's and B's be complete, there will be no B's among the not-A's, or (aB) = 0.

Consequently, $R\frac{(AB)}{(A)} : R\frac{(a\,B)}{(a)} = 1 : 0$, and the difference 1 − 0, or 1 will denote complete association. When $R\frac{(a\,B)}{(a)}$ is a decimal, 1 − this decimal will be the measure of the incomplete association. For instance, in this case $\frac{(AB)}{(A)} : \frac{(a\,B)}{(a)} = 0.05 : 0.00482$ say; on multiplying both ratios by 20 and taking their difference we get 1 − 0.0964 or 0.9036 as the measure of the association.

However, those who have devoted their lives to the study of statistics have not agreed as to the best method of denoting the degree of association, so I merely offer this as a tentative suggestion.

We conclude that in this district there is a definitely strong association between blindness and deafness. On what this association depends may be the subject of a further inquiry. Deafness alone cannot cause blindness; there must be some other factor, which has not been noted in the tables given us, that is the cause of both conditions. It may, for instance, be that there are some steel works in the district, and that the observed association is due to the fact that some have become deaf from the attendant noise, while others have lost their sight from accidents in these works, or syphilis may be prevalent in this district.

(3) Now let (N) = 100. Let us suppose that in the annual report of an eye and ear hospital it is stated that there are 100 in-patients, of whom 40 are deaf, 50 blind, and 2 are both deaf and blind.

Here as before $\frac{(AB)}{(A)} = 0.05$ but $\frac{B}{N} = 0.5$.

The ratio of the blind among the deaf is consequently less than that of the blind to all the inmates of the

hospital. On scrutinizing the data as $(a\,B) = (B) - (A\,B)$ or $50 - 2 = 48$, and $(a) = (N) - (A)$ or $100 - 40 = 60$, we have $\frac{(a\,B)}{(a)} = \frac{48}{60} = 0.8$. So $\frac{(A\,B)}{(A)} \cdot \frac{(a\,B)}{(a)} = 0.05 : 0.8$.

The proportion, therefore, of the blind among the deaf is 5 per cent., while that of the blind among the not-deaf is 80 per cent. The ratio of the two is 0.0625 : 1. To determine the measure of association by the proposed method we must remember that we are measuring the association of blindness and deafness, so we must find the value of 0.0625 − 1, which gives the negative decimal −0.9375, showing that there is a strong negative association, or a disassociation, between blindness and deafness in this assemblage.

A contentious director, if he were totally ignorant of medical etiquette, might say that "As blindness in this hospital protects from deafness, and deafness from blindness, it is obvious that the ophthalmic surgeon is a very good aurist but very inefficient at eyework, and vice versa"; and he might then move that the aurist and the ophthalmic surgeon should exchange their offices.

All aspersions on these worthy men would be removed if it were pointed out that an analogous instance occurred in the adjoining general hospital, where there were 10 cases of fractures and 20 cases of tonsillitis, and no patient suffered from both these affections. The last speaker would perhaps wish that the eminent surgeon and the no less distinguished physician should exchange their parts, on the ground that the surgeon was excellent at curing throats (which he had never seen) but no good for broken bones.

The above will give the reader some idea of the pitfalls that lie in a hasty generalization from statistical tables, unless great care is taken to consider the assemblage from which the tables are drawn. It must always be remembered that hospitals are artificial assemblages: for example, the patients of lock hospitals all suffer (it may be in very different ways) from one cause; whilst those of general hospitals suffer from causes that have little if any association with each other.

To avoid the peculiarities of special assemblages one may naturally turn to the census returns of the United Kingdom, but unfortunately these are useless for most medical purposes, for example, to determine the value of a certain course of treatment, for they do not give all the data required.

I have before me a paper written by an antivaccinationist; the statistics given are analogous to my first example: "99 per cent. of those who had red hair were Canadians." In no instance are we told the number (N) of the assemblage under consideration, we are frequently told the number (V S) of those who had been vaccinated that got small-pox, but never the number (v S) of those that had not been vaccinated that suffered from small-pox, and never the number of the vaccinated (V) or that of the unvaccinated (v) in a district. In 1887 we are told that in the neighbourhood of Sheffield "on they went, vaccinating and revaccinating, and still the small-pox epidemic spread. There were no less than 7,000 cases of small-pox, and alas! 600 deaths, and still the small-pox went on."

This is mere rant. What proportion of the 7,000 cases had been vaccinated? But even if this were given we could draw no conclusion as to the value, or want of value, of vaccination, unless we were given (N), (V) and (V S), as well as the (S) which is given as 7,000. If it is desired to consider the association of vaccination, small-pox, and fatal cases of small-pox, 8 class-frequencies must be given before any conclusion as to the value of vaccination could be drawn with reference to small-pox and its fatalities.

Statistics can be wielded effectively only by those who have taken the trouble to learn how to use them. In order to draw a conclusion about the association of two attributes A and B, it is necessary to compare the proportion, or the percentage, of the B's among the A's with that of the B's among the not-A's, or $\frac{(A\,B)}{(A)} \cdot \frac{(a\,B)}{(a)}$.

It is useless to compare the percentage of the B's among the A's with that of the not-B's among the A's, as is not unfrequently done by company promoters and antivaccinationists. If $\frac{(A\,B)}{(A)}$ and $\frac{(A\,b)}{(A)}$ are compared, it is clear that the canon about the independence of the four class-frequencies has not been obeyed, for $(A) = (A\,B) + (A\,b)$; so only two independent class-frequencies have been given.

Enough has been said to guard the reader from being misled by conclusions drawn from insufficient statistical data.

REMARKS ON THE PATHOGENESIS OF DEFICIENCY DISEASES AND ON PELLAGRA.

BY

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HAVING seen the interesting report by Colonel McCarrison (of the Pasteur Institute of Southern India) on the changes in the organs of pigeons fed on polished rice and suffering from polyneuritis, I wish to call the attention of those interested in this very important group of researches to some results which I obtained several years ago when working on other forms of deficiency diseases; they were published in the summer of 1915, in the Italian review *Sperimentale*, but remained completely unnoticed.

After working for some years subsequent to 1911 on the pathogenesis of pellagra, this problem (at that time less known than now) was carefully examined by me from several points of view. In consequence I was unable to uphold the photodynamic theory of Raubitschek, because I found that the exposure to light of white mice fed on maize neither shortened their life nor did them more harm than maize feeding in the dark.[1] I could not find any precipitins in the serum of pellagra patients (for maize extracts or maize protein) as some had asserted, nor could I demonstrate any positive complement fixation between serums of pellagra patients and maize extracts.[2]

Other researches were directed towards the study of general and local reactions of pellagra patients to the injection of maize extracts under the skin. There was some positive expression of hypersensibility, owing, perhaps, to sensitization of those pellagra patients living on maize meal to maize proteins, through the intestinal tract. My countryman Volpino has worked much on the hypersensibility reactions of pellagra patients to maize extracts.[3]

Without reviewing further my former experimental work, I may say that later on I adopted the conclusion, which was rapidly gaining favour, that notwithstanding new theories on the infectious nature of the disease (I am thinking chiefly of Sambon's Simulium theory), pellagra must be regarded as a deficiency disease, and that the problem of its etiology ought to be studied as far as possible according to the new methods developed chiefly by American investigators. We have not yet succeeded in finding an animal in which pellagra can develop so rapidly and typically as, for example, polyneuritis (beriberi) in fowls and pigeons. The new researches of Chittenden and Underhill[4] seem to show that dogs can become ill with pellagrous symptoms when fed on a special diet, and a long series of investigators have studied the effects of maize feeding on rabbits, and especially on guinea-pigs. I, too, have studied the maidism of guinea-pigs from different points of view, and these are the experimental researches which I think it would be useful to resume in order to make a comparison with the interesting data of McCarrison.

It is well known that exclusive maize feeding very quickly brings about a severe pathological condition in guinea-pigs, which die in a few weeks after having lost about one-third of their weight. In the last period of their life the animals suffer from loss of hair, weakness of the legs, and diarrhoea. We know also from the work of Holst and Fröhlich,[5] and others after them, that guinea-pigs, when fed on cereal grains alone (oats, wheat), develop a typical scurvy-like condition with lesions of bones, bone-marrow, teeth, and blood vessels—these last occasioning a real haemorrhagic diathesis. This scurvy-like condition of guinea-pigs (which is most quickly produced by oat feeding) was considered by Fröhlich, Holst, Funk,[6] and most scientists to be the result of lack of accessory food factors or vitamines. The features of the experimental diseases were compared to those of the scurvy of men, and chiefly to Barlow's disease. Recently

McCollum and his co-workers have denied the existence of antiscorbutic vitamines, and have shown that there are only two accessory growth-promoting and life-maintaining factors, one water-soluble A and the other fat-soluble B. Now[7] the scorbutic condition of guinea-pigs fed on oats would be due less to a lack of accessory factors in the diet —that is, to a chemical deficiency of it—than to a physical character of the cereal grains leading to undue retention and putrefaction of faeces in the enlarged caecum of the animals and thereby to intoxication, with changes in the walls of the vessels and perhaps secondary infections by special bacteria, like those described in the lesions of bones and in the blood by Jackson and Moody.[8] Nevertheless, McCollum, N. Simmonds, and Pitz point to deficiency of factor A in all cereal grains and also in oat kernel.[9] And although they do not recognize scurvy as an avitaminosis, we can still admit that qualitative deficiency of proteins, lack or deficiency of certain accessory factors (chiefly fat-soluble), and of salts play a rôle in the inadequacy of cereal grains when given alone to support the life of animals, with or without other chemical disturbances (acidosis),[10] or with physical conditions of the food (McCollum).

Now I worked in 1913–14 on the effects of maize feeding on guinea-pigs, and published in the *Ricerche di biologia* (Societa tipografica fiorentina, 1914) a short report followed by a long paper in the *Sperimentale* (1915, fasc. 4).[11] I at first tried to show the differences between the more typical scurvy (oat feeding) and the conditions produced by feeding on maize, which is the cereal more related to the etiology of pellagra; also between these two pathological conditions and simple starvation (by complete suppression of food). Like McCarrison I measured the weights of some organs and found the following relative numbers (weight of the organ in proportion to the body weight at death = 100), which of course are average results for many individuals in each group.

	Liver.	Spleen.	Suprarenal Glands.			
			Male.	Female.	Pregnant Female.	Average
Starving guinea-pigs...	3.20 %	0.10 %	—	—	—	0.18 %
Oat-fed guinea-pigs ...	3.76 %	0.10 %	0.22 %	0.27 %	0.33 %	0.27 %
Maize-fed guinea-pigs	3.90 %	0.14 %	0.20 %	0.24 %	—	0.22 %
Normal guinea-pigs ..	3.82 %	0.12 %	0.10 %	0.12 %	0.14 %	0.12 %

Thus in all these conditions the adrenal glands are enlarged, principally in oat-eating and maize-eating guinea-pigs. The loss of body weight is only one-third, while the relative weight of the adrenals is about doubled.

The spleen was reduced in weight, chiefly in the oat-eating and in the starving animals, and some evidence was found of an atrophic condition of this organ, as McCarrison has seen in his pigeons.

My histological observations can be summarized as follows:

The organs which are the most affected in guinea-pigs fed on maize are the spleen, the thyroid, and the suprarenal glands. The spleen shows sclerotic lesions with increase of elastic and fibrous tissue and reduction of lymphocytes in the folliculi. The thyroid shows, in the first days of maize diet, hyperaemia and often proliferation of alveolar epithelium, then haemorrhagic changes and later on sclerosis are prominent.

These changes, as far as I know, have not been observed before, but they may be compared with those remarked by some observers in the thyroid of starving animals or of animals fed on other special diets. The suprarenal glands show hyperaemia, enlargement of minute vessels, degenerative changes in the cortical cells with disappearance of the normal lipoids (Sudan III coloured substances), perhaps slight proliferation in the cells of the outer cortical layer; the reticular fibres (*Gitterfasern*) become thicker, the reaction with chromium salts in the medullaris seems to be less marked. Degenerative changes were prominent in the central nervous system. By means of Nissl's method I observed signs of decay in the anterior horn cells of the spinal cord and in Purkinje cells of the cerebellum, and by Marchi's method frequent irregular fresh degeneration of all sorts of medullated fibres. The changes in the bone marrow were of the same kind, but in a less degree than those observed by Fröhlich and Holst as the result of other cereal feeding. Less marked were the lesions of the liver (some degeneration of liver cells, some hyperaemia, some hypertrophy of Kupffer cells, sometimes perhaps proliferation of these cells), of the intestinal tract, of the kidney, and of the heart.

Guinea-pigs fed on oats had much more marked haemorrhagic lesions; the haemorrhagic diathesis seems to me to belong to the typical scorbutic condition of these animals. As already pointed out by Centanni and Galassi,[12] maize feeding brings about an attenuated scorbutic condition, but the results of my experiments show that the central nervous symptoms, fall of hair, sclerosis of spleen and thyroid, are more marked than in scurvy. As regards the effects of starvation, which were already well known, I confirm the difference from the above named unilateral diets: we have no true sclerosis of organs, lipoids disappear in a much more marked degree from the cortex of the adrenal glands, we have quite different conditions in the bone marrow (the so-called *Hungermark* of the Germans). Histologically, death from maize eating is not death from starvation, but involves deep metabolic changes, as in other real deficiency diseases and in some intoxications.

In order to study the reason of the severe injury caused to the organism by maize feeding I tried to supplement the maize meal or maize kernel with many substances. At that time the important work of McCollum was still unknown, or at least I was not acquainted with results of his which appeared later. Thus I thought first to add some protein or peptone to the maize meal in order to see whether the failure of this grain to maintain metabolism was due to deficiency of protein. The addition to the maize meal of casein (pure casein Merk), or peptone, or amino-acids, such as tyrosin and tryptophan, tried in different series of guinea-pigs, produced no definite improvement of the diet. One year later (1916) McCollum, Simmonds, and Pitz,[13] who worked with their usual method on growing white rats, showed that the maize protein contained all the necessary amino-acids, but not all in the most favourable proportions, that at any rate the deficiency of maize could not be sufficiently made good with casein, and that the protein factor had not the paramount importance for rats that it seemed to have for other animals. Hogan,[14] too, has seen that for rats the first limiting factor in the maize diet is the lack of salts, but that the deficiency of the proteins of maize is, on the whole, less important. I did not take into consideration the salts, but I had already written that the protein deficiency of maize does not seem to have any great importance for guinea-pigs in the development of maidism,[15] and Hogan's experiment of supplementing maize with casein had been made by me on guinea-pigs with the same negative results. Hogan says that for pigs things are on a different basis; protein is here the first limiting factor, as Passerini had already demonstrated in very accurate experiments, which were, of course, unknown to the Americans.[16] I tried further to supplement maize with green food, as Holst and Fröhlich had shown that green vegetables prevent the development of scurvy. I repeated these experiments on guinea-pigs suffering from the pathological condition which arises from exclusive maize feeding, and seems to me (see above) to differ from typical scurvy (from oat and wheat feeding). I found that a quantity as small as 10 grams a day of fresh cabbage produced in every animal a remarkable corrective action. Animals eating maize meal alone (and water) die after an average period of eighteen days (there are great individual differences, some animals living only a few days, others weeks); animals eating maize meal *plus* 10 grams of cabbage died after twenty-five days, and showed loss of weight only in the last days. A few months after the publication of my results in the *Sperimentale* (1915, July–August), I read[17] that Sandwith had confirmed this supplementing value of fresh cabbage for maize eating guinea-pigs. He stated that even smaller quantities of green food were active in this direction. As I had seen that the protein factor was not of much value, and besides this, that the protein content of the active quantities of cabbage was very low, I thought that perhaps there might be in cabbage some accessory factor of unknown composition, some lipoid-bound substance (I had in mind the results of Stepp[18]), or some vitamine-like principle; accordingly I tried to test the action of alcoholic extracts of cabbage

with *positive results* of a prolongation of the average life of maize-meal-eating guinea-pigs. In the light of the new ideas of McCollum I venture to say that with my alcoholic extracts (made with acidulated alcohol at 37°) I partly supplemented the fat-soluble factor A, which is certainly lacking in all cereal grains and in maize meal too, and is abundant in all leaves. Lately, Osborne and Mendel[19] have found in cabbage a lack of water-soluble vitamine B, and therefore in alcoholic extract we may assume that factor A is present.

I tried also to supplement maize meal with alcoholic extract of maize bran, but to no purpose; this again shows that the active substance of alcoholic extracts of cabbage leaves is something which is present neither in maize meal nor in maize bran—that is, something lacking in the whole cereal grain, in the endosperm as well as in the aleuronic layer and embryo; this is the case with factor A, while factor B must be present in good bran with much of the outer layers and embryos of the seed.

I can also state that alcoholic extracts of liver (fresh liver of healthy guinea-pigs) prolonged the life of maize-meal-eating guinea-pigs a little; the active substance was present in animal organs too. This may perhaps be compared with the experiments of Osborne and Mendel, who found the liver, heart, and kidney (of pigs) very rich in growth-promoting vitamine for rats,[20] and of Eddy, who isolated a growth-promoting substance from sheep's pancreas. Thus I came to the conclusion that in animal organs and in the green parts of plants there must be some alcohol-soluble body which diminishes the harmful action of maize diet on guinea-pigs; but with the means at my disposal I could go no further in my analysis.

It is well to remember, too, that I found a diminution of adrenalin in the suprarenal glands of maize-eating animals, using the biological method of Fraenkel (action of suprarenal glands ground up and suspended in saline solution on the uterus of virgin rabbits, and registration of the contraction of the muscular organ); contrary to the results of experiments by McCarrison on pigeons fed on polished rice, pointing to an increase of adrenalin. The difference may be attributed to the different conditions of experimental work and of diet and to the zoological remoteness of the animals used. My work on the etiology of pellagra did not produce conclusive results, but it has established certain facts which may be important in the etiology and pathogenesis of maidism in guinea-pigs and of pellagra in man. I do not assume the identity of these two conditions; the differences are obvious, but there are some resemblances too. It is a fact that maidism is an experimental deficiency disease due to the lack in maize of the elements necessary to maintain animals. McCollum, Simmonds, and Parsons[21] do not look upon pellagra as a real avitaminosis in the sense used by Funk and do not recognize a pellagra vitamine, but still they maintain that the experimental symptom-complex obtained by Chittenden and Underhill in dogs is to be attributed to protein factors, partly to lack of factor A and of salts. For the maidism of guinea-pigs we may still admit a complicated deficiency of maize meal, and we may state that green vegetables and fresh animal organs contain corrective substances. Maidism, at any rate, has features which I think separate it from simple starvation and from typical scurvy.

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AT the commencement exercises of the New York University and Bellevue Hospital Medical College it was announced that the institution would in future admit women and would grant them the degree of M.D. on the same terms as men.

A Collective Investigation
OF
TEN THOUSAND RECRUITS WITH DOUBTFUL HEART CONDITIONS.

Conducted at the National Hospital for Diseases of the Heart by C. CHAPMAN GIBBES, R. O. MOON, S. RUSSELL WELLS, P. HAMILL, FREDERICK W. PRICE, *and* J. STRICKLAND GOODALL.

REPORT III.*

COMPILED BY

S. RUSSELL WELLS, M.D., B.Sc.

THE ETIOLOGY OF AORTIC REGURGITATION.

Syphilis.

OF the 307 cases 11 gave a history of syphilis, but in no less than 7 of these there was a definite history of rheumatic fever, and of the remaining 4, the first, a carman aged 39, had had a fever of a doubtful nature which may have been acute rheumatism, and presented definite signs of mitral stenosis and regurgitation as well as of aortic regurgitation; his syphilis had been acquired six years before examination. The second was a man of 30 years of age, who said he had had rheumatism, which he described as "muscular," but which laid him up for three months when he was 28; as, however, he stated he had had gonorhoea no less than eight times, the true rheumatic nature of the affection must at least be regarded as doubtful, probably it was gonorrhoeal rheumatism. The third, aged 34, gave no history of illness beyond his syphilis five years ago, except scarlet fever; he showed signs of mitral regurgitation which was probably secondary, as he had albumin in his urine and other signs of failing circulation. The fourth, a man of 30, gave no history of any illness other than syphilis four years ago except tonsillitis eight years before, and influenza. He was classified as pure aortic regurgitation. Thus, out of the 11 cases, in 4 at the most, that is, 36.4 per cent., and possibly in only 3 (27.3 per cent.), can syphilis alone be credited with being the cause of the aortic regurgitation.

TABLE XIII.—*Comparing all the Cases of Aortic Regurgitation dealt with, with those giving a Syphilitic History.*

	No. of Cases	With Rh. Fever.	With Rh., G.P., or Ch	Without Rh. History
Total Ao. R.	307	162=52.8%	73=23.8%	72=23.4%
Ao. R. and syphilis ...	11	7=63.6%	1=9.1%	3=27.3%

Making due allowance for the small numbers involved in the case of syphilis, the percentages are very similar. This suggests that the coincidence of syphilis and aortic regurgitation in the three or four cases where there was no definite history of rheumatic fever may be fortuitous. It may be objected that we are dependent in these cases upon the man's word alone for a history of syphilis, and that frequently its presence has been concealed. No doubt it would have been better, had it been possible, to have determined the Wassermann reaction in every case. This, of course, was impracticable, but, as has been pointed out in a previous report, by reason of the exceptional circumstances of these examinations there was far less likelihood of concealment than usual. Moreover, the results quite confirm the impressions gained on taking the Wassermann reaction of a series of hospital out-patients suffering from aortic regurgitation.

Ratio of Pure to Mixed Lesions.—We may record, for what it is worth, the fact that the proportion of pure aortic to mixed lesions is higher in the syphilitic cases than in the total aortic regurgitants with a history of rheumatic fever—that is, 1.2 as against 0.76. Of the syphilitic cases without a definite history of rheumatic fever 2 were pure aortic and 2 mixed lesions. Very little importance can be attached to these figures, as the number of syphilitic cases is too small.

It will be seen that the investigation of these cases leads to the conclusion that syphilis is not of much importance as a cause of aortic regurgitation in the case of men

* Concluded from p. 514.

between the ages of 18 and 41—first, because only 3.6 per cent. of the cases with aortic regurgitation gave any history of syphilis, and secondly, because of this 3.6 per cent. 63.6 per cent. gave a history of rheumatic fever—a figure quite comparable with the percentage of total aortic regurgitants giving a like history.

Gonorrhoea.

In 16 cases out of the 307 there was a history of one or more attacks of gonorrhoea. In 10 of the 16 cases there was a definite history of rheumatic fever, 4 gave histories of rheumatism, one being the doubtful one referred to above under syphilis; another, a labourer aged 40, stated that he had been in hospital twice as a child, at an interval of about two years, for rheumatism, but his statements were too vague for these illnesses to be classified definitely as rheumatic fever; in the third there was no history of the man being confined to bed with his joint pains; the fourth gave a history of rheumatic attack lasting six weeks. Two cases gave a history of gonorrhoea and none of rheumatism; one of these, a mechanic aged 29, had resided in the Philippine Islands, and had had scarlet fever at 5 and dengue at 28; he had thickened and tortuous arteries, and was a case of pure aortic incompetence; the other, a cobbler aged 37, gave no history of any other illness, except pneumonia a year before—he was classified as aortic regurgitation and mitral regurgitation, the latter being probably secondary.

Hence, in 10 of these cases rheumatic fever may safely be said to have occurred, and there is a possibility of rheumatism in at least three and possibly four more; that is to say, 81 per cent. gave a history of rheumatic fever and its allies, and only 19 per cent. that of gonorrhoea apart from rheumatism; or, if we count the doubtful case as rheumatism, 87.5 per cent. and 12.5 per cent. respectively.

TABLE XIV.—*Gonorrhoea.*

	No. of Cases.	With Rh. Fever.	With R., Rh. Fever.	Without Rh. History
Total Ao. R.	307	162=52.8%	73=23.8%	72=23.4%
Ao. R. and gonorrhoea	16	10=62.5%	4=25.0%	2=12.5%

Ratio of Pure to Mixed Lesions.—Seven showed evidence of lesions of the aortic valves alone, while in 9 there was mitral involvement as well. This is a ratio of 0.7, which is practically the same as the 0.76 found for the 162 cases with a history of rheumatic fever. Of the 6 cases of gonorrhoea without a history of rheumatic fever, 3 were pure aortic lesions and 3 mixed, a ratio of 1, so there is a slight preponderance of pure aortic lesions here as in the case of syphilis, but the numbers are too small for any argument to be based upon them.

The analysis of these cases afforded little or no support to the view that gonorrhoea is an efficient cause of aortic regurgitation.

As Table XV shows, whether we consider as having a rheumatic history only those cases with a definite history of rheumatic fever, or whether we take as rheumatic those giving a history of either rheumatic fever, "rheumatism," growing pains, or chorea, the proportion showing a history of rheumatism is so large that we may neglect tonsillitis, scarlet fever, diphtheria, pneumonia, influenza, syphilis, and gonorrhoea as important causes of aortic regurgitation.

TABLE XV.—*The Importance of Rheumatic Affection.*

	Percentage with History of Rh. F.	Percentage with History of R., G.P., C.	Percentage with History of R.F., R., G.P., C.	Percentage without any Rheumatic History.
Total Ao. R.	52.8	23.8	76.6	23.4
Ao. R. and tonsillitis ...	66.6	11.7	78.3	21.7
„ and scarlet fever	63.4	18.3	81.7	18.3
„ and diphtheria ..	68.2	22.7	90.9	9.1
„ and pneumonia..	60.0	10.0	70.0	30.0
„ and influenza ...	57.7	21.8	79.5	20.5
„ and syphilis ...	63.6	9.1	72.7	27.3
„ and gonorrhoea .	62.5	25.0	87.5	12.5

With regard to the relation of pure to mixed lesions in the different affections, the following table shows that in the case of "rheumatism," chorea, tonsillitis, scarlet fever, pneumonia, and influenza, there is a tendency for cases giving these histories to show a preponderance of mixed lesions as compared with pure aortic lesions. This preponderance is due to many of these cases exhibiting an apical systolic murmur as well as the murmurs associated with aortic trouble, and rather suggests that while none of these diseases are answerable for damage to the aortic valves, it is possible that they may have some relation to the production of the apical systolic murmur. The numbers are, however, small, and we do not wish at the present stage to draw any definite deductions from them.

TABLE XVI.—*Ratio of Pure Aortic to Mixed Lesions.*

	Total.	Pure to Mixed Lesions.	Ratio.
Rheumatic fever	162	70 : 92	0.76
"Rheumatism" without R.F. ...	38	14 : 24	0.58
Growing pains „ „ ...	36	15 : 21	0.71
Chorea „ „ ...	10	3 : 7	0.43
Tonsillitis „ „ ...	20	6 : 14	0.43
Scarlet fever „ „ ...	26	8 : 18	0.4
Diphtheria „ „ ...	7	4 : 3	1.3
Pneumonia „ „ ...	6	2 : 4	0.5
Influenza „ „ ...	60	21 : 39	0.5
Syphilis „ „ ...	4	2 : 2	1.0
Gonorrhoea „ „ ...	6	3 : 3	1.0

Since the number of cases of aortic regurgitation with a history of rheumatic fever bear so large a proportion to the total number of aortic regurgitants, it is obvious that they may swamp the other causes in calculating the correlation. It was therefore thought wise to calculate the coefficients of correlation in a universe of discourse from which a history of rheumatic fever had been excluded. Of our 10,000 cases, 1,921 gave a history of rheumatic fever, and of our aortic regurgitants 162 gave a like history. This gives us a universe of 8,079 cases, 145 of which showed signs and symptoms of aortic regurgitation.

TABLE XVII.—*Showing the Correlation between Aortic Regurgitation and the Various Suggested Etiological Factors, with the Numbers on which the Calculations are Based.*

A.	B.	Number of Cases. History of A. and B.	History of A. only.	History of B. only.	No History of A. or B.	Coefficient of Correlation.	Limit of Error.	χ^2.
A. R.	"Rheumatism"	38	107	1,309	6,625	0.175	0.022	9.66
„	Growing pains	36	109	2,050	5,884	0.018	0.022	0.076
„	Chorea	10	135	154	7,780	0.203	0.021	17.58
„	Tonsillitis ...	20	125	1,665	6,269	0.165	0.021	4.46
„	Scarlet fever ...	26	119	1,680	6,254	0.067	0.022	0.899
„	Diphtheria ...	7	138	551	7,383	0.085	0.022	0 992
„	Pneumonia ...	8	137	432	7,502	0.002	0.022	0.001
„	Influenza ...	60	85	4,349	3,585	0.210	0.021	10.36
„	Syphilis... ...	4	141	141	7,793	0.065	0.022	0.778
„	Gonorrhoea ...	6	139	436	7,498	0.060	0.022	0,507
„	Strain	84	61	2,269	5,665	0.433	0.018	59.35

A. = Aortic regurgitation. B. = Etiological factor under consideration—for example, rheumatic fever, chorea, or the like.

An inspection of Table XVII shows that on account of the low values of χ^2 in the other cases, the only correlation coefficients worthy of consideration are those for "rheumatism," chorea, influenza, and strain. In the cases of influenza, chorea, and "rheumatism" the correlation is low, but there is moderate correlation between

aortic regurgitation and strain. It is not a little remarkable that while the correlation between rheumatic fever and aortic regurgitation is 0.499 ± 0.015, if rheumatic fever is excluded, the correlation coefficient between aortic regurgitation and strain should be as high as 0.433 ± 0.018 while χ^2 is 59.35.

Age Incidence of Aortic Regurgitation.

It is generally considered that the incidence of aortic regurgitation increases with advancing years. The material with which this investigation is concerned being limited roughly to the years between 16 and 41 does not afford an opportunity for investigating those changes which occur in the latter stages of middle life and in old age. Still, it may be of some interest to tabulate the age incidence in that portion of life with which we are concerned.

TABLE XVIII.—*Comparing, with Grouping in Quinquennial Periods, the Total Number of Recruits Examined, with the Total Number of Aortic Regurgitants found in each Quinquennium, omitting Cases below 17 and over 41 years of age.*

	17–21	22–26	27–31	32–36	37–41
Total recruits examined ...	2103	2023	2307	2114	1413
Aortic regurgitants	72	62	75	57	38

Since the number of cases examined in the different quinquennial periods was different, the percentages of the total aortic regurgitants in any quinquennium does not give a true estimate of the age incidence. For instance, 75 of the total 307 cases occurred in the quinquennium 27–31, while only 38 were seen whose ages were between 37–41. This great difference is, however, accidental, because 2,307 of the total 10,000 cases occurred in the quinquennium 27–31, and only 1,413 in the quinquennium 37–41. It is therefore obvious that the numbers in any period must be contrasted with the total number of cases examined belonging to that period rather than with the total of the particular lesion. Table XIX gives such a comparison:

TABLE XIX.

	Total Recruits Examined.	Total Aortic Regurgitants.	Ao. R with no History suggestive of Rheumatism.
Ages 17 to 21 ...	2103	72=3.4%	17=0.8%
Ages 22 to 26 ...	2023	62=3.1%	12=0.6%
Ages 27 to 31 ...	2307	75=3.3%	16=0.7%
Ages 32 to 36 ...	2114	57=2.7%	16=0.7%
Ages 37 to 41 ...	1413	38=2.7%	10=0.7%

It will be noted that there is on the whole a decline in the incidence of aortic regurgitation between the years 17–41. This strongly suggests a cause, or causes, acting early in life, which either cease before middle life is approached or have a steadily decreasing incidence with advancing years. Rheumatic fever suggests itself as one such cause, for it is generally admitted that the incidence of rheumatic fever declines as middle life is approached, and an examination of the detailed analysis confirms this, as the decline in incidence applies to the cases giving a rheumatic history rather than to those without any history of rheumatism.

Cause in Cases without a History of Rheumatism.

The question now arises, what was the causal agent in the 72 cases where there was no history of rheumatism? It is possible that these men may have had rheumatism, which, because it occurred early in life, they may have forgotten, or which was not recognized because it was so slight. Before reaching such a conclusion, every other suggested cause should, so far as possible, be eliminated, and, since physical strain, alcohol, and tobacco have been regarded as such causes, it was thought well to investigate the occupations and habits of these cases of aortic regurgitation.

Since it is safer to base our conclusions on cases with definite histories, we shall divide the 307 into three groups:

I. 162 with definite history of rheumatic fever.
II. 73 with history of "rheumatism," growing pains, or chorea, where the rheumatic origin of the aortic regurgitation must be considered doubtful.
III. 72 cases where there was no rheumatic history.

Alcohol and Tobacco.—A careful scrutiny of the histories as to tobacco and alcohol fails to reveal even a suggestion of any connexion between excess in these stimulants and aortic regurgitation. The results as to strain, however, were far more fruitful.

Strain.—Arranging the cases of aortic regurgitation according to their occupations alone, we find that 158 were in employments involving light muscular labour, 100 in the medium and 49 in the heavy groups.

TABLE XX.—*Giving a Comparison between the Percentages in each Occupational Group of the Aortic Regurgitants with the Total 10,000 Recruits examined.*

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits	58.0 %	26.5 %	15.5 %
Total Ao.R.	51.5 %	32.5 %	16.0 %

This shows no striking difference between the distribution of occupations in the total number of recruits and that in the aortic regurgitants, beyond, possibly, a tendency in favour of medium labour rather than light. When, however, we divide the aortic regurgitants into groups according to their history of previous illness, more interesting facts come to light.

Taking first the 162 cases giving a history of rheumatic fever, 91 were in light occupations, 5 in medium, and 16 in heavy.

TABLE XXI.—*Comparing on a Percentage Basis the Total Rheumatic Cases and Number of Recruits seen.*

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits	58.0 %	26.5 %	15.5 %
Ao. R. with history of rheumatic fever	56.8 %	33.3 %	9.9 %

Here there has obviously been a drift from the heavy occupations into those entailing only medium muscular exertion.

Taking the cases with a doubtful rheumatic history—that is to say, the 73 who gave an account of previous "rheumatism," growing pains, or chorea, it was found that 33 were in light occupations, 22 in medium, and 18 in heavy.

TABLE XXII.—*Percentage Comparison: Doubtful Rheumatism.*

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits	58.0 %	26.5 %	15.5 %
Ao.R. with "rheumatism," growing pains, or chorea	45.3 %	30.1 %	24.6 %

Here the medium and heavy employments bulk larger than in our standard of comparison. There has certainly been no drift into the lighter occupations, and the numbers even suggest that the strenuous work may have been an etiological factor.

An investigation of the 72 cases of aortic regurgitation who gave no history of either "rheumatism," growing pains, or chorea, furnishes a comparable result; 33 were in light occupations, 24 in medium, and 15 in heavy.

TABLE XXIII.—*No History of Rheumatism.*

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits	58.0 %	26.5 %	15.5 %
Ao.R. without rheumatic history...	45.8 %	33.3 %	20.9 %

But while occupation is a fair guide as to the strenuousness of a man's work, according to our former definition, it cannot be properly used when discussing the incidence of strain. A man may be subjected to muscular strain either as a result of his work or his amusements. The dock labourer and the blacksmith, for instance, are obviously perpetually undertaking heavy physical exertion, but the clerk, whose business hours are passed in sedentary employment, may, in his spare time, be undertaking heavy physical work in the form of football, rowing, or other athletic exercises. As in every case the amount and character of the exercise in which the recruit was in the habit of indulging is recorded, it has been possible to tabulate these cases under the headings of light, medium, and heavy exercise, the classification depending in some cases on the man's employment, and in some on his games.

TABLE XXIV.—*Aortic Regurgitants with History of Rheumatic Fever.*

Lesions.	Exercise.		
	Light.	Medium.	Heavy.
Aortic regurgitation alone	28	19	9
Aortic regurgitation and aortic stenosis ...	7	5	2
Aortic and mitral regurgitation	30	11	12
Aortic and mitral regurgitation and aortic stenosis	0	2	1
Aortic regurgitation and mitral stenosis...	7	2	2
Aortic and mitral regurgitation and mitral stenosis	6	7	2
Aortic, mitral, and tricuspid regurgitation	1	0	0
Aortic regurgitation and pericarditis ...	3	2	0
Aortic and mitral regurgitation and pericarditis	1	0	0
Aortic and mitral regurgitation, mitral stenosis, and pericarditis	2	0	1
	85 52.5%	48 29.6 %	29 17.9 %

It will be seen that 52.5 per cent. come under the heading of light, 29.6 per cent. of medium, and 17.9 per cent. of heavy exercise.

TABLE XXV.—*Comparing Numbers in Table XXIV with the Percentages for Light, Medium, and Heavy Exercise for the whole 10,000 Cases examined.*

	Exercise.		
	Light.	Medium.	Heavy.
10,000 recruits	50 0 %	22.9 %	27.1 %
Ao.R. with history of rheumatic fever ...	52.5 %	29.6 %	17.9 %

It will be noticed that there is a definite tendency for the aortic regurgitant who has had rheumatic fever, and whose lesion consequently is probably of rheumatic origin, to avoid both occupations and amusements which involve muscular strain.

In the case of the 72 aortic regurgitants who gave no history of any form of rheumatism the figures are strikingly different, as shown in Table XXVI. This shows 23.6 per cent. light, 11.1 per cent. medium, and 65.3 per cent. heavy muscular exercise, as compared with 52.5 per cent. light, 29.6 per cent. medium, and 17.9 per cent. heavy for the group with rheumatic fever—a difference which seems too great to be purely accidental. The fact that 65.3 per cent. of this group were exposed to

TABLE XXVI.—*Aortic Regurgitation without History of Rheumatism.*

Lesions.	Exercise.		
	Light.	Medium.	Heavy.
Aortic regurgitation alone	4	2	11
Aortic regurgitation and stenosis	0	0	8
Aortic and mitral regurgitation	9	6	16
Aortic and mitral regurgitation and aortic stenosis	1	0	0
Aortic regurgitation and mitral stenosis...	0	0	2
Aortic and mitral regurgitation and mitral stenosis	1	0	7
Aortic and mitral regurgitation and aortic and mitral stenosis	1	0	2
Aortic regurgitation and pericarditis ...	0	0	1
Aortic and mitral regurgitation and pericarditis	1	0	0
Total 72	17 23.6 %	8 11.1 %	47 65.3 %

strain, in the absence of any other likely factor, strongly suggests that strain was the efficient cause in producing the cardiac lesion. We think it is not generally realized what an extent even comparatively short and light muscular work can raise the blood pressure and so produce increased tension of the aortic valves and other parts of the circulatory system. It is true that more than half of these cases were instances of mixed lesions, but an inflammatory and subsequent sclerotic process, starting in the aortic valve, may easily spread by continuity to the aortic flap of the mitral valve, and no doubt in many of the cases of mixed aortic regurgitation and mitral regurgitation the mitral regurgitation was due to secondary dilatation of the mitral ring, without any structural change in the valve. It may therefore be conjectured that the 47 cases of aortic regurgitation subjected to heavy muscular work, but who gave no history of rheumatism, were due to strain.

In the remaining 25 the cause is not so obvious. Three out of the 72 cases without a history of rheumatic fever had a syphilitic history, which is about the proportion we should expect if this were purely accidental, since 11 out of the total of 397 gave a similar history.

A comparison of the numbers in the light, medium, and heavy classes of Group II (those with a history of "rheumatism," growing pains, or chorea) gives percentages roughly intermediate between Groups I and III—namely, 30.1 per cent., light, 19.2 per cent. medium, and 50.7 per cent. heavy.

TABLE XXVII.—*Aortic Regurgitants with History of "Rheumatism," Growing Pains, or Chorea.*

Lesions.	Exercise.		
	Light.	Medium.	Heavy.
Aortic regurgitation alone	8	3	10
Aortic regurgitation and stenosis	1	2	4
Aortic and mitral regurgitation	7	4	17
Aortic and mitral regurgitation and aortic stenosis	0	1	0
Aortic regurgitation and mitral stenosis	1	1	0
Aortic and mitral regurgitation and mitral stenosis	5	1	4
Aortic and mitral regurgitation and aortic and mitral stenosis	0	1	0
Aortic regurgitation and pericarditis ...	0	1	1
Aortic and mitral regurgitation, mitral stenosis, and pericarditis	0	0	1
Total 73	22 30.1%	14 19.2%	37 50.7%

Table XXVIII, which summarizes these results, shows clearly that the more completely a history of rheumatism is eliminated, the higher among aortic regurgitants is the percentage of cases in the group exposed to severe strain.

TABLE XXVIII.—*Summary.*

	Strain.		
	Light.	Medium.	Heavy.
10,000 recruits ... ... — ...	50.0%	22.9%	27.2%
Ao. R. with history of rheumatic fever	52.5%	29.6%	17.9%
Ao. R. with history of "rheumatism," growing pains, or chorea	30.1%	19.2%	50.7%
Ao. R. without rheumatic history ...	23.6%	11.1%	65.3%

This led us to suspect that in Group II (those with a history of "rheumatism," growing pains, or chorea) a certain number of cases were due to strain and the rest to rheumatism. These 73, together with the 25 in light and medium classes of Group III, thus constitute a doubtful class, distributed as follows:

TABLE XXIX.

	Exercise.		
	Light.	Medium.	Heavy.
98 Cases	39	22	37

We were led to try how 98 cases would be distributed on the assumption that the proportion due to rheumatism and the proportion due to strain was the same as that found in the cases we considered might legitimately be classed as due to these causes. Since 162 cases have been classified as due to rheumatism and 47 as due to strain, we divided the 98 cases in the same proportion, and allotted 76 as probably of rheumatic origin and 22 as caused by strain. Dividing the rheumatic 76 into light, medium, and heavy classes, in the same proportion as those in which our 162 rheumatic cases were found to be divided, we obtained 40 light, 22.5 medium, and 13.5 heavy; adding to the heavy group the 22 we had assumed to be caused by strain, the following figures were obtained: 40 light, 22.5 medium, and 35.5 heavy.

TABLE XXX.—*Comparison between the Calculated Numbers and those Actually Found.*

	Exercise.		
	Light.	Medium.	Heavy.
Calculated numbers	40.0	22.5	35.5
Actual cases	39.0	22.0	37.0

The agreement is so striking that it is hard to imagine it purely accidental.

SUMMARY.

The results of this investigation lead to the conclusion that the two important causes of aortic regurgitation in the cases we have investigated—that is to say, men between the ages of 18 and 41—were rheumatic fever and strain. We have been unable to find any definite correlation in these cases between syphilis, tonsillitis, scarlet fever, diphtheria, pneumonia, gonorrhoea, or growing pains, and the evidence is against influenza. With regard to chorea, there is a suggestion in some of the results that it may be a cause, but the number of cases with which we had to deal was so small, and the proportion of them giving a history of rheumatic fever as well so large, that caution must be exercised in drawing deductions. With regard to a history of "rheumatism," there is some evidence for supposing that in a certain proportion of these cases, but not all, an affection of the same nature as true rheumatic fever was referred to.

THE second Child Welfare Congress of South America (Congreso Americano del Niño), which was to have been held at Montevideo in December of the present year, has been postponed till May, 1920, on account of problems arising out of the war and the prevalence of influenza.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

TREATMENT OF PUERPERAL SEPTICAEMIA BY "BIPP."

FOR the last two years I have used long strips of gauze or bandage saturated with bipp for packing wounds and cavities, in military surgery, in many thousands of cases. I have invariably been absolutely satisfied with the results, to the exclusion of all other treatment.

I have treated two seemingly hopeless cases of puerperal septicaemia, with the most astonishing results. Both cases were, of course, first scraped and douched in the ordinary way; they were then packed with a long strip of sterilized gauze saturated in fairly liquid bipp. For the first three times the packing was removed daily, the cavity washed out and again packed. After that the pack was changed every two days. In one of the cases the uterine cavity was down to normal size in a week and in the other case in eleven days. In one, all serious symptoms had disappeared after forty-eight hours. When I reached the other patient the whole vestibule, vagina, and uterine cavity was one mass of sloughing tissue. She was pulseless, and had rigors every few minutes. A big bit of stinking cloth was found in the uterus. All serious symptoms ceased after six days. One of the patients was a European lady, the other an Indian. The bipp used was of the strength of total solids to paraffin of 1 to 3—that is, "bi" represented one part and paraffin three parts. Some of the paraffin was vaseline and some liquid paraffin, in order to make it sufficiently thin so that the interstices of the gauze might be filled. I never used bipp stronger than this. For ordinary conditions I find 1 in 8 or 1 in 16 quite enough.

There are three things to be remembered about bipp. The least oil or fat will cause poisoning. There should be no crystals of iodoform; an amorphous powder should be used. Direct sunlight (and indirect after a while) changes its colour and makes it useless.

Before I thought of packing with bipp gauze I used a Bozeman double-flow catheter, fixed in position, to irrigate the uterus continuously with saline flowing in and out night and day. This is not nearly so effective or so easily done as bipp packing.

Nairobi, British East Africa. R. W. BURKITT, F.R.C.S.I.

A CASE ILLUSTRATING THE DIFFICULTY OF DIAGNOSIS IN HEAD INJURIES.

THE following case is useful as showing the difficulties that may be met with in dealing with head injuries, where every important symptom is obscured by complications.

At 6.30 p.m. on February 26th, 1919, a man aged 72 was admitted to the East Suffolk Hospital with free haemorrhage from a cut 1½ in. long over the right eyebrow. Three silkworm gut sutures efficiently controlled the bleeding, and there was no evidence of either indentation or fracture of the vault or base.

The patient was very cold and apparently unconscious. The pulse was full, 40. The left pupil was dilated and reacted to light. The right lens was opaque. There was intense rigidity of all the body; the fists were clenched and the forearms flexed across the chest. The knee-jerks were increased, Babinski's and Kernig's signs were present with great irritability, but the patient took fluids by mouth. There was retention of urine; it was drawn off and found to contain albumin. Some oedema of the legs was noticed. Lumbar puncture showed the spinal fluid to be slightly under pressure and mixed with blood. His whole condition indicated intense shock, and localization of the injury was not possible owing to the complex symptoms and the complications present; operation was therefore delayed.

Operation.

On the evening of the third day the bowels had not acted and there was suppression of urine. Surgical intervention being necessary, Mr. Hossack operated by turning down a flap over the injured area. The outer table was found to be fissured; a very fine crack started half an inch above the supraorbital foramen, and ran for about three inches along the right temporal region at an angle of 45 degrees with the horizontal.

The skull was trephined over the fissure; when the dura was incised there was an outflow of blood-stained cerebro-spinal fluid. Free bleeding was coming from the direction of the longitudinal sinus; this was followed up by the rongeur, and the sinus was found to be bleeding at the position of the anterior fontanelle; an extensive thin clot was present. The aperture was plugged with Horsley's wax. The patient died next morning.

Necropsy.

Post mortem the sinus was found to have been effectively plugged. The cerebro-spinal fluid was intimately mixed with blood, and the foramen of Munro was occluded by clot on the left side. Other organs were normal, with the exception of the lungs, which showed hypostatic congestion.

History.

It was stated that the patient had fallen, on the day of admission, while crossing his room during convalescence from influenza, and had fallen twice previously during the previous eighteen months, with no untoward result. He was stone deaf and blind in the right eye.

There was great difficulty in arriving at a diagnosis. The presence of albumin suggested the possibility of his being in a uraemic condition. Eye symptoms were masked by his having only one eye. There was no paralysis. Intellectual faculties were said to be poor. Blood in the spinal fluid pointed to haemorrhage within the cranium. The rigidity suggested some medullary lesion; the history a possible cerebral thrombosis.

K. S. VINE, L.M.S.S.A.,
House-Surgeon.

Reports of Societies.

POLYMORPHISM OF THE MALIGNANT EPITHELIAL CELL.

AT the meeting of the Pathological Section of the Royal Society of Medicine on April 15th, 1919, Dr. E. H. KETTLE said that the majority of adeno-carcinomata might exhibit much the same structure, but from time to time examples were met with in which the tumour cells possessed a varying degree of polymorphism which might even be so extreme as to make the correct classification of the growth a matter of the greatest difficulty.

That the malignant epithelial cell was capable of polymorphism was well recognized. The interchangeability of the acinous and the solid structure in adeno-carcinomata was familiar, and the origin of a squamous-celled carcinoma from columnar epithelium had been reported on several occasions. Greater variations than these, however, were not, as a rule, considered possible. Krompecher, indeed, held that under certain conditions of growth and environment epithelial cells might assume a spindle form and become converted into connective tissue elements, but his views had not found general acceptance, and the doctrine of the specific nature of cell growth was not seriously questioned. Without going so far as to claim that the adult epithelial cell could actually become changed into a connective tissue cell, Dr. Kettle was convinced that some carcinomata possessed such extreme powers of polymorphic growth that their cells, losing all trace of their epithelial origin, became indistinguishable from connective tissue elements. This had been observed in the propagation of certain carcinomata in the mouse, and a similar process could be demonstrated in human tumours. The recognition of this power of polymorphic growth was particularly important in the study of those cases in which multiple malignant tumours occurred simultaneously in the same individual. Most examples of this condition in the different growths were widely separated anatomically, and appeared to be equally independent biologically. Very rarely, however, double tumours occurred in which carcinomatous and sarcomatous elements were so closely blended that it was impossible to separate them. These neoplasms, usually known as carcinoma-sarcomatodes or "mixed tumours," were essentially carcinomata in which the stroma had sarcomatous properties, and bore a close resemblance to the mixed tumours which developed in the course of propagation of carcinomata in mice; only 28 such cases had been recorded in man. Dr. Kettle offered an alternative explanation. A suspiciously high proportion of the cases had occurred in the thyroid gland and the uterus, and the tumours of these organs were prone to present unusual features. Many of the reporters appeared to have rigid conceptions of the morphology of the malignant cell, and though they had accepted and applied to their own material the researches on sarcoma production of the experimental laboratories, they had paid little attention to those other observations which demonstrated the extreme powers of polymorphic growth possessed by the malignant epithelial cell. Where it was possible to study the growth of these tumours experimentally doubtful points might be cleared up and satisfactory conclusions reached. With human material this was not practicable, and the tumour was seen only in one phase of its growth, and it might not be possible to interpret what was seen. Conclusions drawn from the study of human tumours should be examined before they were accepted much more critically than those arrived at from the study of experimental ones. Amongst the large number of tumours which had passed through his hands during the last twelve years many presented quite unusual features. Some of them, from the complexity of their structure, might be regarded as "mixed tumours," but he thought it more reasonable to explain them as instances of extreme polymorphic growth of carcinomata.

Absolute proof was impossible in the absence of any method which would enable their behaviour on transplantation to be studied, but he felt no doubt that the interpretation he offered was correct. It was most important to make allowance for the morphological elasticity of the epithelial cell in interpreting any anomalous growth. Failure to do this led to erroneous conclusions, and if the study of human cancer was to help in the solution of the problem as a whole, the facts upon which theories were based must be beyond criticism.

Reviews.

THE PURPOSE OF PHYSIOLOGICAL RESEARCH.

DR. HALDANE, in *The New Physiology*[1] gives his reader much food for thought. The main subject of these addresses may be said to be the consideration of what should be the attitude of the physiologist in regard to the interpretation of the phenomena with which he is concerned. It is very clear that the author has thought deeply on the problem, and his views deserve the most careful attention. I should like, first of all, to express my hearty agreement with the greater part of what he says. A review is apt sometimes to give a false impression of the reviewer's appreciation of a book, because points of disagreement present too great a prominence. In the present case, moreover, I do not always feel confident that I have rightly grasped the author's meaning, and may therefore do him injustice by attributing to him opinions which he does not hold. In any case, it is to be hoped that the result will be to send the reader to the original in order to understand the argument.

The author states that he is neither a "vitalist" nor a "mechanist." He will have nothing to do with guiding "entelechies" or "vital force." On the other hand, he is equally convinced that the phenomena of life can never be described in the language of physics and chemistry. In this latter attitude, as it seems to me, he speaks with too hasty a voice. I take it that no physiologist holds that all physiological facts can at the present time be "explained" in physico-chemical language. But do we know enough to state that we are dealing with phenomena which "differ, not only in complexity, but in kind from physical and chemical phenomena"? (p. 19). It may perhaps ultimately turn out to be so, but the case is surely quite different from that of the distinction between the phenomena of consciousness and the physiological processes in nerve cells, which will be admitted by all to be incapable of expression in the same set of terms. Is there not, also, some contradiction between this view of a difference in kind between biological and physico-chemical phenomena and the opinion expressed on p. 105, that "evolution seems to lead, not towards reduction of the organic to the level of the inorganic, but, on the contrary, towards the raising of the inorganic to the level of the organic"? As I understand it, the object of explanation in science is to bring more and more facts under the operation of fewer and fewer wide-reaching general laws, although the problem of philosophy may be otherwise.

[1] *The New Physiology and Other Addresses.* By J. S. Haldane, M.D., LL.D., F.R.S. London: Chas. Griffin and Co. 1919. (Demy 8vo, pp. 156. 8s. 6d. net.)

Dr. Haldane appears to hold that a large number of physiologists are "mechanists" in the sense in which he defines the word; but I cannot avoid the impression that the views attributed by him to this class are really held by few, if any, of its members. For example, on page 140, the view is attributed to them that "physiologists ought to advance from the sure and familiar ground of physics and chemistry to the unknown ground of biology." The proper function of the physiologist, according to Dr. Haldane, is to investigate the interrelation between the processes taking place in an organism as a whole. If I understand this rightly, it is also implied that even if we analyse the phenomena separately into their physical and chemical elements we have not arrived any nearer to an explanation of vital phenomena. It is clear, however, from Dr. Haldane's own researches, that he does not condemn the practice; indeed, if such analyses do not belong to the province of the physiologist, what science will investigate them?

The addresses deal with the relation of physiology to physics and chemistry, the place of biology in human knowledge, natural selection, the question of the irreducibility of physical, biological, and psychological categories to one another, and the relation of physiology to medicine. The last will probably be of most interest to the readers of this JOURNAL, and the author's remarks will be found of great interest. But he is surely not quite fair to the authors of modern textbooks when he states that "there is no description of the organic regulation which absolutely dominates all the mechanical and chemical details." It is doubtful whether the want of contact between physiology and practical medicine is to be explained by the ignoring of teleological conceptions by teachers of physiology. The reviewer would be inclined to look elsewhere. But Dr. Haldane is undoubtedly right in pointing out that the old name of "institutes of medicine" well describes the fundamental position of physiology as the basis of medicine.

In the same address to the Edinburgh Pathological Club the establishment of clinical laboratories for research and chairs in medicine and surgery, to be held apart from private practice, is strongly advocated. A small detail, with which we may disagree, is the suggestion that experiments requiring animals would be better done in the main university laboratories. Even if this separation is desirable, the work must be done in close association. Every one will agree with the concluding remarks of the address, that an essential part of medical education is a broader general education, along with more science. We must not forget, also, that physiology has relations to other regions of learning and practice, as well as to the cure of disease.

To return to the main thesis—I may be an optimist, but I feel that we can with advantage go further in our investigation of animal heat, for example, than "the assumption that warm-blooded animals actively maintain a certain body temperature, just as they maintain a certain bodily structure and composition." I may be misrepresenting Dr. Haldane's position by removing this passage from its context, but I am inclined to resent the statement that the above is "the only kind of explanation which really interests and appeals to a true physiologist" (p. 15). On page 78, again, we read that the maintenance of the normal is the really important physiological problem, and that there is no place for this in the mechanistic physiology. We must remember, however, that an organism does not exist apart from its environment, and that it is not altogether inconceivable that a machine might be made to repair its own wear and tear if the right materials were in its environment. Some appropriate constituent, for example, might be present in the lubricating oil which would deposit on the bearings the metal worn away, although the discovery of it would scarcely be worth the labour.

Notwithstanding the above remarks, there is no doubt that Dr. Haldane is abundantly justified in directing our attention to the fact that the phenomena of living organisms must be the object of a science distinct from physics and chemistry, whatever views we may hold on the ultimate possibility of describing them in terms of the simpler sciences. In the same way, chemistry is a separate science from physics, although it may be held that it will become in the end the physics of the atom. W. M. B.

CLINICAL MEDICINE.

THE fifth edition of the late Dr. SAVILL'S *System of Clinical Medicine*[2] has been revised by Dr. Agnes Savill with the assistance of many writers, and in many sections rewritten. The particular character of the work is that it is based on symptoms—an arrangement which has commended itself to many practitioners desiring a quick reference in this way, though for students, who must learn their medicine by studying cases as complete entities, it may be unwise to focus attention on a symptom and build up a diagnosis thereon.

At the present time the reviewer naturally turns to the diseases which the war has rendered prominent, and it is a little disappointing to find that these have received brief mention only. Thus, trench fever, which will call for much treatment at the hands of the practitioner, is dismissed in a few lines, and no mention is made of the part played by the louse in spreading the disease, though this was reported in the current literature of March, 1918. More stress might have been laid on the debilitating effects of this infection. Again, the so-called trench nephritis is barely mentioned, though in its microscopic anatomy there are definite characteristics, and it seems probable that the very widespread incidence of albuminuria amongst the troops in France will result in an increase in the number of cases of renal inadequacy in this country. Nor should the statement that subcutaneous injections of oxygen are useful in the treatment of trench feet be allowed to pass without challenge. Again, the remarkable results which have been obtained in the treatment of the irritable heart of the soldier are worthy of recognition and incorporation in a book dealing with treatment, for much has been learned which will be of value in civil life. These are, however, criticisms of detail. For the rest, it need only be said that the revision has been carefully and thoroughly done. The section on nervous diseases, revised by Dr. Harry Campbell, calls for particular notice on account of its clearness, all essential information being included without overloading the subject.

To the busy practitioner the fifth edition of this *System* will certainly appeal, from the convenience of its arrangement and the value of its contents.

A TEXTBOOK FOR MIDWIVES.

THE call for a second edition of Dr. FAIRBAIRN'S *Textbook for Midwives*[3] is, one hopes, an indication of the correctness of his expectations when he wrote the book, namely, that a more educated class of woman was adopting midwifery as a profession and would want more advanced teaching than is to be found in the smaller manuals for midwives. Not only does Dr. Fairbairn provide all that a nurse can be expected to know about midwifery, but there is an excellent introductory section dealing with anatomy, physiology, and bacterial infection. Special attention is given where necessary to points stressed under the regulations of the Midwives Boards for England and Scotland. Throughout the book the writing is of the most lucid kind, and the teaching of the most practical order, as was to be expected from an author with Dr. Fairbairn's reputation as a teacher. The printing and illustrations are also good, and the only thing about the book which we condemn is its price. The reviewer's copy is marked 20s.—which even under war conditions is a very high price to demand from nurses and pupil midwives for a book of 350 pages, even if the pages were quarto.

NOTES ON BOOKS.

DR. RENDLE SHORT has undertaken the laborious task of editing the *Index of Prognosis*[4] to supplement the volumes on *Treatment* and *Differential Diagnosis*, published by

[2] *A System of Clinical Medicine, dealing with the Diagnosis, Prognosis, and Treatment of Disease.* By T. A. Savill, M.D. Fifth edition. London: Edward Arnold. (Pp. xxviii and 948; with four plates in colour and 170 illustrations. 28s. net.)

[3] *A Textbook for Midwives.* By John S. Fairbairn, M.A., B.M., F.R.C.P., F.R.C.S. Second edition. London: Henry Frowde, and Hodder and Stoughton. 1918. (Roy. 8vo, pp. xiii+350; 113 figures, 3 plates. 20s. net.)

[4] *An Index of Prognosis and End-Results of Treatment.* By Various Writers. Edited by A. Rendle Short, M.D., B.S., B.Sc.Lond., F.R.C.S.Eng., Captain R.A.M.C.(T.). Second edition, revised and enlarged. Bristol: John Wright and Sons, Limited; London: Simpkin, Marshall, Hamilton, Kent, and Co., Limited; Toronto: The Macmillan Company of Canada, Limited. 1918. (Demy 8vo, pp. xi + 770. 30s. net.)

Messrs. John Wright and Sons of Bristol, some time ago. To enable the practitioner to give as faithful a prognosis as possible, Dr. Short has compared the results obtained by various physicians and surgeons with hospital cases and those in private practice, and it can hardly be doubted that he has thereby greatly enhanced the value of his work. Yet in spite of his desire to omit misleading theories, he has been led to make at least one doubtful assumption—namely, that in bronchial asthma there is said to be an anaphylaxis between that disease and egg-albumen. If the offending food is removed from the diet, the general condition of the patient almost invariably improves, and often a cure results. How rare an event!

The 1919 edition of the *Directory of District Nursing and Streets List* for London has now been issued by the Central Council for District Nursing in London. The Directory has been found of use by social workers and others, and is the only publication of its kind which, in addition to the special information as to district nursing, shows for practically every place in the metropolis the City or borough and the Poor Law union in which it is situated. The price (2s. 6d.) is considerably below the cost of production.

A POST-GRADUATE MEDICAL ASSOCIATION.

A MEETING was held on April 29th at the Royal Society of Medicine to discuss the proposed formation of a Post-Graduate Medical Association. The basis of the discussion was the scheme for post-graduate medical education which has been approved by the London medical schools, existing post-graduate schools, and special hospitals, and was published in the BRITISH MEDICAL JOURNAL of April 5th (p. 424).

Sir WILLIAM OSLER, who presided, said that the scheme was the outcome of many conferences between the schools and hospitals concerned. Matters with regard to the provincial schools, it was thought, might be better arranged at this later stage. There were three possibilities—to extend existing post-graduate schools; to establish separate colleges; or to unite the medical schools, post-graduate colleges, and special hospitals in an association which would consolidate all the teaching interests. The last had been chosen as the most hopeful. These various schools and hospitals had consented to arrange special classes and to give facilities for research work and general study. Arrangements, it was hoped, would be made for utilizing the enormous material in the fever hospitals and Poor Law infirmaries, and to give special students an opportunity to study problems relating to public health and preventive medicine. In connexion with the representative council to be set up there would be a permanent secretarial staff, whose duties would be to keep in touch with every medical school in the United States, the Dominions, India, and Egypt, so that at least every quarter there would appear on the bulletin board of these schools abroad information about post-graduate work in the United Kingdom; also to receive students on arrival in London, and to provide weekly information as to post-graduate facilities. The secretary's office, in fact, would combine the functions of a clearing house and of a university registry. Branch offices could be established at the provincial schools, and it was to be hoped that there would be co-operation with a similar organization in Scotland and Ireland. There would be interchange of information with the Paris Post-Graduate Committee; and British students wishing to visit the United States or the Dominions for graduate work could find in the central bureau up-to-date information. Another point of importance was the organization in each county centre of a yearly post-graduate course of ten days or two weeks, free, or at a very small cost, to all practitioners of the neighbourhood; such classes might be held at the county hospitals, and the central organization could be of great help in furnishing special teachers. There was no reason why they should not join in a general overseas students' union, though these details were for subsequent arrangement. The important thing was to pool their interests, get the teachers everywhere to realize the importance of post-graduate instruction, and energy, patience, and organization would do the rest. He moved: "That a Post-Graduate Medical Association be formed on the lines laid down in the printed scheme."

Sir BERTRAND DAWSON formally seconded, and the resolution was carried *nemine contradicente*.

Sir GEORGE NEWMAN said that the President of the Board of Education desired him to express his good wishes for the success of post-graduate teaching in medicine in this country, though this did not mean that the Minister was committed to the particular scheme in hand. The speaker gave three reasons why such a scheme should be inaugurated: First, there had been lately a great expansion of medicine, and such movements as were represented by the Insurance Act and the Ministry of Health indicated the urgent importance of a higher qualification and a greater degree of expertness on the part of the mass of private practitioners. In saying this he was not imputing blame to anyone, but some means must be taken to bring the practitioner into closer touch with the newer forms and applications of medicine and surgery. The second reason was that the medical curriculum for the ordinary undergraduate was much overloaded. It might possibly be lightened at the beginning by a fuller equipment of the student in respect to primary scientific subjects before he entered the medical school; but it could certainly be lightened at the end if there existed an adequate system of post-graduate study. The third reason was the need for using the material, at present largely wasted, in the great treatment institutions lying outside the twenty-two medical schools—namely, Poor Law institutions, asylums, and a number of county and borough hospitals—which were not being woven into the whole scheme of medical education and advance. The treatment provided in many of those institutions would be all the better if they were connected with some system of medical education for practitioners living in the neighbourhood. Nearly twenty-five years ago he himself was drawn into Sir Jonathan Hutchinson's post-graduate scheme, which, unfortunately, came to an untimely end, largely because it was an *ad hoc* post-graduate teaching centre, not directly connected with a teaching hospital. The success of post-graduate schemes in Germany and America was largely due to the fact that they were associated, intimately and organically, with the teaching hospitals. The Polyclinic scheme failed partly because it could not always maintain the "university standard" in the teaching of medicine, and by a "university standard" he meant one which sent the student away not only with a new method but with a new vision. Nothing was more damaging to a scheme than that occasionally a man should find himself put off with an indifferent course, a casual teacher, and an ill-equipped laboratory. He trusted also that the promoters of the new scheme would not forget that preventive medicine was not a subject by itself, but a pervading influence affecting medicine, surgery, obstetrics, and pathology, as much as it affected public health.

Sir JOHN GOODWIN, Director-General A.M.S., said he had great pleasure in supporting the scheme because he felt that the present position with regard to post-graduate teaching had arisen owing to the demands of the army upon the profession. Every day he was seeing young officers about to be demobilized, whose professional study had been grievously interrupted for the last three or four years. He thought it might be possible to help this movement by placing the Royal Army Medical College at the disposal of the association, though on this point he spoke tentatively.

Professor G. E. MACLEAN (Director of the American Universities' Union) pledged the co-operation of that body. When America came into the war 153 of the leading universities and colleges in the United States organized that union to look after the college men in the American Expeditionary Force. The head quarters of the union were in Paris, and there was one branch in London, and one in Rome. Now the war was over it was hoped to retain the league of universities as an "anchor to the windward" for the League of Nations. Its aim was to bring about interchange of professors and students, and to serve as a clearing house of information, including the giving of particulars to British students as to opportunities for study in the United States.

General H. S. BIRKETT, C.A.M.C. (McGill University, Montreal), felt certain that the scheme would be the means of bringing Canadian students to London, and he paid a tribute to the work already done by the Fellowship of Medicine. Dr. GUSTAVE MONOD, of the French army, spoke of the movement as likely to help to maintain the international understanding. He added that things were

so difficult in France at the present time that theirs was the cry of the Macedonian.

Various representatives of British universities then spoke in appreciation of the scheme. Professor SIMS WOODHEAD (Cambridge) said that Cambridge could not provide any great amount of clinical material, but there were branches of scientific work relating to medicine in respect to which the university would be most willing and anxious to contribute. Professor A. HALL (Sheffield) promised the cordial co-operation of the Medical Faculty of his university. Professor H. R. DEAN (Manchester) said that in Manchester for more than a year they had had a committee to deal with the subject of post-graduate teaching. Manchester was as rich in clinical material probably as London; it had only one medical school, but that would facilitate co-ordination. Professor BLAKE (Liverpool) said that the Medical Faculty at Liverpool would consider the matter very sympathetically. Dr. DOUGLAS STANLEY (Birmingham) did not think that the provincial as distinct from the metropolitan universities could expect many outsiders. Their schemes would have to be purely local, and much patience and skill in organization would be needed. He urged that every school partaking in the post-graduate scheme should be represented on the committee to be elected.

After Lieut.-Colonel A. F. HURST, Honorary Secretary of the Provisional Committee, had made a statement, in the course of which he said that it was never intended to make the scheme a London one, the following resolution was moved by Professor WILLIAM WRIGHT, seconded by Dr. T. W. SHORE, and carried *nemine contradicente*:

> That each London undergraduate medical school be invited to appoint two representatives to serve on the Council of the Association, and that all other participating institutions be invited to appoint one representative. That the Board of Education, the Medical Research Committee, the Dominions of Canada, Australia, New Zealand, and South Africa, and the United States be invited to appoint one representative each. That the Council shall have power to co-opt not more than five distinguished laymen interested in medical education on to the Council of the Association.

DOGS' PROTECTION BILL.

THE medical members of Parliament have issued a statement, which has been circulated to all other members of Parliament, in which they seek to give a short outline of the facts in connexion with the Dogs' Protection Bill. As we point out elsewhere, it is important that members of the profession should communicate with their representatives in Parliament, and we print the leaflet here as it contains considered arguments which will be of use to them in stating the case. (We have introduced some cross-headings into the statement.)

STATEMENT BY MEDICAL MEMBERS OF PARLIAMENT.

The following are very shortly the chief reasons why we ask our fellow members of Parliament to consider the effect of the above bill very seriously, and if possible to join in voting for its rejection.

The antivivisection agitation has gone on for a very long time, and has resulted in the passage of bills which protect animals from pain and from unnecessary experiments to a very complete degree, and dogs and some of the larger animals are very specially protected. The agitation, nevertheless, still continues, and promotes appeals to the public by deliberate misrepresentations, by partial quotations, by speaking of medical men who support the agitation as "eminent" when they have no title whatever to such an appellation, and in many other ways. The result is that many philanthropic persons are led to believe that cruelty and "torture" are going on in this country, which is directly contrary to the truth, and that no useful results are being or ever have been obtained from experiments on animals. We, who have been in active medical practice and know the facts and can gauge what the loss to humanity would be if experiments on dogs were entirely prohibited, wish therefore to place the following facts before you for your consideration.

Two Classes of Experiments.

There are two classes of experiments which are performed on dogs—namely, experiments involving subcutaneous injections or experiments on diet, and experiments involving cutting operations.

The first kind of experiments (subcutaneous injections) are not commonly performed on dogs because smaller animals are more suitable than dogs, and are, as a rule, more susceptible to the various infective diseases. In the case of dogs this method has been chiefly employed in investigations on distemper, on malignant jaundice of dogs, and on rabies. Feeding experiments have been recently employed in puppies with a view of ascertaining the cause and treatment of rickets, and satisfactory positive results are being obtained, but by no stretch of the imagination can such experiments be described as "torture."

Cutting experiments are always performed under an anaesthetic and may be grouped under two heads—namely, those where the animal is killed without recovering consciousness, and those where the animal is allowed to recover from the anaesthetic and is kept alive unless he suffers pain.

In the great majority of cases the animal is killed without recovering consciousness, and in these there is, of course, no pain. The greater part of physiological work is done on animals under those circumstances; and it is only rarely in that work that the dog is kept alive after the operation, though in a few cases (such as the study of the secretions) it may be necessary to let the animal recover from the anaesthetic and live for a time provided it does not suffer pain.

In some experiments relating to methods of surgical treatment it is, however, necessary to keep the animal alive, but here also it suffers no pain.

Existing Safeguards.

Under the existing law all dogs experimented on under the second heading (cutting operations) must be placed profoundly under an anaesthetic and the great majority must be killed before recovering from the anaesthetic. Something like 10 per cent. are kept alive under another certificate, but must be killed if they fall ill or suffer pain. Anything like pain or "torture" preceding or during an experiment would entirely vitiate the result. The inspector constantly visits the laboratories and sees the animals and may be present at experiments. Any further suggestions which may be made for ensuring that the dogs do not suffer pain will be readily carried out by those engaged in these investigations.

Results of Experiments on Dogs.

Results of the greatest value have been obtained from experiments on dogs. Physiology, or the science of the normal functions and processes of the living body, is based to a very large extent on observations made on dogs. Our knowledge of the action of the heart, of the processes of digestion, of the functions of the brain and nervous system, of external and internal secretions, of nutrition, and, indeed, of all the vital processes, is the result of researches and experiments continued over many years, and could not have been gained without experiments on dogs.

Without knowledge of the normal functions of the living body it would be impossible to deal with or even to recognize in many cases disorders of these functions due to disease, and it must be borne in mind that our knowledge of these subjects is still very far from complete; the complexity of the vital processes only becomes more and more evident as research goes on, and it must not be supposed that we have in any way exhausted the knowledge to be obtained from experiments on animals.

Results of the greatest value in the treatment of disease in the human subject have also been obtained from experiments on dogs. To mention only a few of these: the work which has been done with regard to the processes of digestion, especially by Pavlov, has opened up new views as to the treatment of gastric and intestinal disorders; much valuable work has been done with regard to dropsy; a great deal of light has been thrown on the nature and treatment of diabetes; organic and functional disorders of the heart have been studied with good results to soldiers who have been at the front; the work on localization of the functions of the brain has been of the greatest service in connexion with wounds and injuries of the brain,

enabling the surgeon to expose the exact seat of the injury often with most beneficial effects; methods of dealing with wounds of and operations on the intestines have been established as the result of experiments on dogs; the same is the case with arterial surgery and other matters. Here, again, there is still very much more to be learned.

Results have also been obtained of value to dogs themselves. For example, much has been learned as to the nature of distemper, and a vaccine has been introduced which, in the opinion of many dog breeders, is of the greatest value in protecting the animals from this disease. In the case of malignant jaundice in dogs, due to a parasite in the blood, a drug has been found (trypan blue), which has given very remarkable results.

Effect of the Bill.

Many of these physiological and pathological experiments can only be carried out on dogs. The blood vessels of the dog, for example, are of a suitable size for such work as arterial surgery; the structure of the tissues and their metabolic processes approximate closely to those of man; the dog takes an anaesthetic well and better than other of the lower animals, and can be kept profoundly under its influence for a sufficient length of time; and the dog can do well on a mixed diet similar to that of man. It would be impossible in many cases to replace the dog by any other animal, and if experiments on dogs were absolutely prohibited the advance of physiology and pathology and medical treatment in this country would be very seriously interfered with, and in some matters would come to an end altogether. It is hoped that those who have to decide the fate of this bill will bear these facts in mind, and will fully realize the immense responsibility of their decision. No doubt the work would go on abroad, and our own workers would go there from time to time to carry out researches in which they were interested. But the scientific work must be carried out in this country if it is to attract the attention of and convince those whose duty it is to apply the advances of science to the treatment of disease in man.

(Signed) W. WATSON CHEYNE. D. MURRAY.
W. E. ELLIOTT. NATHAN RAW.
A. C. FARQUHARSON. WILLIAM WHITLA.
BOUVERIE MACDONALD. ROBERT WOODS.
J. E. MOLSON.

THE FUTURE OF THE TERRITORIAL MEDICAL SERVICE.

IT appears that the reconstruction of the Territorial Force is being very much expedited, and that within a very short time a new scheme will be adopted. Apparently no steps are being taken to consult the officers who have borne the heat and burden of the day, and have gained their knowledge in the bitter school of experience in the war. The Government would be well advised to take immediate steps to call a conference and so obtain the valuable knowledge which these officers possess. This would tend to prevent a repetition of the many gross mistakes made during the recent campaign. Upon the particular problem of the Territorial Medical Service a well-informed correspondent sends us the following observations:

Mr. Churchill, in his speech to representatives of the Territorial Force Association at the City Hall, Westminster, on April 1st, made some appreciative remarks on the Territorial Force. His statement that, "Had its organization been used to build up the war army as was originally intended and conceived by Lord Haldane . . . we should have avoided many of the difficulties that confronted us at the outset, and we should have put a larger efficient force in the field at an earlier stage," was particularly applicable to the Medical Service. We have all seen the lost opportunity for clinical and scientific research in the early stages of the war, due almost entirely to the difficulty of placing medical officers when called up in their most useful sphere. This serious drawback was very obvious in 1915–16, and even in the last two or three years of the war it had not been entirely remedied. For instance, it was fairly common knowledge that surgeons of the highest experience and specialists in their own line were sent out with field ambulances and spent their time in collecting cases from the field of battle when they should have been doing the necessary operations at the casualty clearing station, where a man unaccustomed to operating, or newly-qualified, was to be seen puzzling his brains over patchwork surgery. This state of affairs was difficult to remedy later on, because until late in 1917 there were no records of the particular capabilities of the medical men sent out. Eye specialists and dentists were treated on the same lines. It was not uncommon to find an eye specialist or a dentist doing general duty in a field ambulance. Even to the present time only a small percentage of the cases requiring eye or dental treatment are seen by those most competent to treat them. It would have been easy when forming the many new medical units needed to arrange that instead of medical officers being moved about like logs of wood, they were posted by a staff who knew something of their abilities; it would not have taken a very big hotel to house the clerks required. After all, there were only about 6,000 medical officers in the Expeditionary Forces to deal with, and the records of all were available.

Why was the medical officer of the Territorial Force put at a disadvantage as regards pay and gratuity (which, by the way, he has to wait for till the end of his war service) by introducing a flat rate of 24s. for temporarily commissioned officers? Again, why should a captain of six years' service only get 15s. 6d. a day at home, or at Gibraltar or Malta, while young officers with practically no military medical training get 24s.? Did all the Territorial's training count for nothing? Was it all wasted time? Yet the field ambulances of the Territorial Force were found very useful in 1914 and 1915; they were well trained and ready to take the field, and made splendid records; on the other hand, some of the casualty clearing stations sent out without any pre-war experience and training were not successful. It was no fault of the Territorial Force system and training that caused the Territorial medical officer to be overlooked for promotion and command. Whatever the cause was, it was there and will be there in the future unless the senior Territorial Force medical officers are given a chance to learn executive work and use their experience when the time comes. As to the future, it is to be hoped that the Territorial Force medical officers who know what they want, and the condition of service suitable to them, will be consulted. The seniority list is a splendid thing, and was easy to work during the war, but how will it work in the future? A command becomes vacant and the next officer for it on the list lives miles away; he accordingly has to stand down and let a junior officer take it. The Territorial Regimental M.O. was a backwater man with very little opportunity for training and practically no executive experience, and so was retarded in promotion. One can hardly expect the Territorial Force Medical Service to continue or the practitioner to join it unless these and other matters are arranged to suit him. How often one hears it said by Territorial officers that they were fools to join before the war! Some of them have been told so by Regular R.A.M.C. senior officers, and now they know it. One thing shows this disadvantage at the present time: Is the M.O. who went out early and sacrificed his practice and his all getting the fat jobs under the National Service or Pensions Ministries? It seems that the man on the doorstep is getting the loaf while the man who fought and won it is getting the crumbs.

Mr. Churchill would do well to start with a clean slate and give the Territorial Force medical officer some guarantee that all his pre-war work will not be thrown to the winds in the next emergency. The Territorial Medical Service should be made the foundation of a larger expansible scheme for the future, and the men who join it should be chosen for their skill and usefulness. Let them understand what is expected of them when the time comes, and let it be known that they will be trained free of personal expense and loss. The Government will find that this policy pays when it comes to a fight.

British Medical Journal.

SATURDAY, MAY 3RD, 1919.

THE SCIENTIFIC FUTURE OF THE R.A.M.C.

WE have more than once had to express regret that excellence in medical research and clinical work does not meet with its due reward in the Army Medical Service, and that for this reason so many of its more ambitious officers are tempted to leave the scientific and clinical sides for the administrative, because the latter has been regarded as the only sure road to promotion. This divorce of the higher ranks of the Service from the practice of medicine and surgery, and from the current of thought in pathology and preventive medicine, leads inevitably to a state of mind that obstructs advance in every direction—a fact of which, as we pointed out a year ago, some deplorable illustrations have been afforded in the Home Commands. We have on many other occasions expressed the opinion that this defect in the system is a real misfortune for the R.A.M.C., and have urged that the rules or customs of the Service should be so altered as to ensure that an officer who seeks distinction as a surgeon, a physician, a pathologist, or a bacteriologist, should be able to feel confident that his prospects in his own service shall be as good as the prospects of his colleagues who quit these difficult spheres of work for the task, intellectually less arduous, of administering hospitals, divisions, or commands. It is with great satisfaction, therefore, that we publish this week, on p. 562, an official statement describing the scheme put forward by the Director-General A.M.S., and now approved by the Treasury, for improving the status of the Army Medical Service as a scientific organization.

We were aware that Sir John Goodwin, when he assumed his present office at a most critical period of the war, had set his heart on effecting some such reorganization as this. We are glad to believe that what we have written from time to time has strengthened his hand. The preamble to the outlined scheme speaks of "the urgent need for a better system." These are strong words, as strong as any we have used in criticism of the existing state of affairs; coming from within the Service they clinch the argument of the outside critic. The present scheme is the first step forward; others will no doubt follow in due course, but it is the first step that costs. The aim of the scheme is to raise the standard of hygienic and pathological work in the army, by creating within the Army Medical Department an organization which will ensure close co-operation between those working within and outside the army, so that the benefits of new knowledge shall be utilized to the fullest extent for the preservation of the health of the troops, while at the same time the Army Medical Service shall be in a position to contribute to the advance of medicine and pathology.

The Service is fortunate in having at its head at this time of reconstruction a man of foresight and breadth of view, who has held to his plan of reform and carried it through despite many pressing preoccupations. We learn that in formulating the scheme the Director-General has had the expert assistance of Major-General Sir William Leishman, F.R.S., with regard to pathology, and of Colonel Sir William Horrocks with respect to preventive medicine; he has had, moreover, the warm support of the Army Medical Advisory Board; but it is, we imagine, a personal achievement to have enlisted the practical sympathy both of the Finance Department of the War Office, and of the Treasury, in a scheme of scientific reform involving a yearly outlay of, perhaps, £30,000. The sum is ridiculously small compared with the greatness of the object in view, but all who know anything of the bureaucratic attitude towards science, when money is in question, will agree that Sir John Goodwin must have put his case more than well to carry these departments with him. The R.A.M.C. owes him a deep debt of gratitude.

It is, perhaps, too soon to describe this plan for the setting up of directorates of hygiene and pathology as the Magna Charta of science in the Army Medical Service; but it is certainly the most important medical reform that has taken place in the army since the creation of the Royal Army Medical Corps. Everything now depends upon the spirit in which it is carried into effect, and the rapidity with which it is supplemented by further efforts in the same direction. We are glad to learn that authority has been obtained for setting up, in each command, a school of hygiene for the education of regimental medical officers in practical methods of sanitation, and the special training of those who aspire to posts in the directorate of hygiene. Developments along other lines may be expected to include means for the special encouragement of clinical distinction.

DOGS' PROTECTION BILL.

As the day (May 23rd) for the third reading debate in the House of Commons of the so-called Dogs' Protection Bill draws near we would again call the attention of all members of the medical profession to the appeal made to them in our issue of April 12th to take an active part in enlightening public opinion as to the necessity of experiments on animals, and on dogs in particular, for the advance of medical science. There is one direction in which such action seems especially necessary, and to be effective it should be prompt. Many of the members of Parliament, by whose votes the fate of this bill will be decided, are little better informed than the rest of the community concerning the true facts of the position. We have had the opportunity of seeing a letter from one member, who states that he has received "an enormous number of letters in favour of the Dogs' Protection Bill and very few against it." There must be many such who would welcome a sober statement from their medical constituents showing the necessity of experiments on dogs if the progress of medical science is to continue in this country, and explaining the protection from the infliction of pain in such experiments which the existing law already affords. Every member of Parliament probably has his regular and trusted medical adviser, and should be ready to receive expert advice, on a matter of such enormous importance to the national health, from the man to whom he entrusts the care of his own.

The medical members of Parliament have done their part, and the circular they have issued to other members of the House of Commons (published at p. 552) is a brief but comprehensive statement of the unanswerable case for the rejection of the bill. All the forces of obscurantism which have for a generation traduced the medical profession have been

mobilized again, and full use has been made of the habitual methods—suppression of the truth and suggestion of the false. Many eminent members of the profession—physiologists, physicians, and surgeons—have placed the true facts before the public in the columns of the *Times* and some other newspapers; we may particularly mention the reasoned and well documented statements made by Sir Charles Ballance and Mr. W. G. Spencer, setting out the debt of surgery to experiments on dogs. Something more, however, is wanted to bring home to individual members of Parliament the threat to the advance of medical science and practice and to the better prevention of disease contained in this ill-considered measure. This want can be supplied by the action here suggested to be incumbent on all members of the profession.

THE HONOURS LIST.

A PART of the New Year honours list, publication of which has been delayed owing to the Prime Minister's absorption in the work of the Peace Conference, was issued on Monday. Among the names it contains are those of medical men who have rendered long and loyal service to the profession. The dignity of a baronetcy is conferred on Dr. Norman Moore, President of the Royal College of Physicians of London. His official connexion with St. Bartholomew's Hospital began in 1874, when he became lecturer on comparative anatomy and warden of the college; subsequently he was lecturer in pathology, and is now consulting physician and emeritus lecturer on the principles and practice of medicine at the hospital. He was Harveian Orator in 1901, and Harveian Librarian of the Royal College of Physicians from 1910 until his election to be President last year; in that office he has shown a living interest in the affairs of the profession, and has helped to the wise solution of many difficult questions. The honour of knighthood is conferred on Mr. J. M. Cotterill, C.M.G., Lieutenant-Colonel R.A.M.C.(T.), consulting surgeon to the Edinburgh Royal Infirmary, lecturer on clinical surgery, Edinburgh School of Medicine, and formerly president of the Royal College of Surgeons of Edinburgh. Colonel Cotterill has acted during the war as commandant of the great military hospital at Craigleith. The same honour is conferred on Dr. Edward Malins, professor of midwifery in the University of Birmingham, a former president of the Birmingham Branch of the British Medical Association and of the Obstetrical Society of London; and on Mr. Charles Sissmore Tomes, LL.D., F.R.S., who has been Crown nominee on the General Medical Council for twenty years, and is at present its senior Treasurer. In the early part of his career he was engaged in the practice of dentistry and in dental research; he was a pupil of Huxley, and at the time of his election one of the youngest Fellows of the Royal Society. He is chairman of the Dental Education and Examination Committee of the General Medical Council and was one of the members of the recent commission appointed by the Lord President of the Council to inquire into the extent and gravity of the evils of dental practice by persons not qualified under the Dentists Act. The announcement that a knighthood is conferred on Dr. T. Jenner Verrall will be received with particular pleasure by members of the British Medical Association. He has been an active member for many years; he was a member of Council before the reconstruction of 1902, and a member of the Reconstitution Committee. He was elected chairman of the Representative Body in 1912, and presided over its meetings for the three following years; he was elected a direct representative on the General Medical Council in the same year, and received the gold medal of the Association in 1914. The honour now conferred is in recognition of his services as chairman of the Central Medical War Committee during the past four years, in which capacity he has greatly assisted both the Army Council and the Ministry of National Service in obtaining medical officers for the navy, army, and air force. The same honour is conferred on Mr. W. S. Glyn-Jones, M.P., Secretary of the Pharmaceutical Society of Great Britain; upon Mr. Arthur Lucas, for forty years Chairman of the Hospital for Sick Children, Great Ormond Street; and on Professor R. A. Gregory, assistant editor of *Nature*, who has been active in the organization of the British Scientific Products Exhibitions.

THE NATURE OF RABIES.

THE rapid increase during the last few weeks in the number of areas in England and Wales in which cases of rabies in dogs have been verified has naturally caused much public disquietude, and some irritation among the owners of dogs, especially lap dogs, who resent the restrictions imposed by the muzzling order. Rabies is primarily an infectious disease of the carnivora, especially the dog, wolf, and jackal, but the cat may also easily be infected, and the disease has occurred from time to time as an epizootic in cattle, sheep, pigs, horses, and deer, and can, it is well known, be communicated to man. The virus has not been certainly identified, although there is ground for believing that the bodies described by Negri in the central nervous system, and known by his name, are evidence of the reaction of the protoplasm to the virus. The Negri bodies, according to Muir and Ritchie, have been found in practically 98 per cent. of cases of spontaneous rabies in dogs—the *rage des rues* of Pasteur. Captain J. A. Wilson, in his communication to the British Medical Association meeting three weeks ago, gave particulars of a minute rounded body (0.1 to 0.3 μ in diameter) obtained after filtration of material from the nervous tissues, salivary and lymphatic glands, and in some cases the stomach, of infected animals; their characters were demonstrated by him at the Lister Institute. The Negri bodies occur in all parts of the nervous system, especially in the spinal and cerebral ganglia. Rabies, in fact, appears to be primarily a disease of these nervous centres, and the characteristic symptoms would seem all to be accounted for on this hypothesis. In its rarer form in the dog, so-called dumb-rabies, paralytic symptoms predominate; they affect especially the jaw and the lower limbs, and this form is the less dangerous, since the animal cannot bite, although the infection may be conveyed to an abrasion licked by the animal. The incubation period in dogs appears to be from twenty to forty days; in man the usual period is said to be forty days, though much longer intervals have been noted. In the ordinary form in the dog—unhappily called furious rabies, for the saliva is infectious long before the outbursts of fury—the first symptom is, as a rule, dullness combined with fidgets; the irritability increases and the animal tears up, and perhaps swallows, its bedding; later it appears to be subject to hallucinations, and periods of apathy are interrupted by furious paroxysms in which it will snap at anything and anybody. The muscles of the larynx and throat are affected, the bark is hoarse and emitted in a manner which is said to be characteristic. There is no fear of water, and the appetite, at any rate in the early stage, is often voracious. If the animal gets loose it will run aimlessly for long distances until it drops from exhaustion. In man also the upper respiratory passages are affected, and there is great difficulty in swallowing; the effort is attended by painful contractions of the muscles of deglutition and respiration, often followed by a tetanic state, with marked opisthotonos and temporary arrest of respiration, so that the patient eventually refuses to attempt to drink—whence the term "hydrophobia," applied to the disease in man. The percentage of cases in which death in man follows the bite of a rabid dog has been variously stated. According to Bollinger, when the

wound has not been cauterized 83 per cent. of the persons bitten die; when it has been cauterized, 33 per cent. It is now believed, as the memorandum of the Local Government Board indicates, that the use of the actual cautery may be replaced by the free application of undiluted carbolic acid or undiluted izal or similar disinfectant. We know of no statistics which show the mortality of rabies in dogs, but there seems to be little doubt that dogs possess much less resistance to the disease than man. Pasteur, in describing his method of preventing the development of the disease in 1884, showed that the virulence of the virus when passed from the dog to the monkey and afterwards from monkey to monkey is much enfeebled, until a point is reached at which inoculation from the monkey does not give rabies to the dog. On the other hand, the virulence of the virus is increased by being passed from rabbit to rabbit, and it was upon this that Pasteur founded his treatment. The method was first tested upon the dog, and was applied to man with the more confidence because the resistance offered by human tissues to the virus was known to be much greater in man than in the dog or rabbit. After obtaining a virus of constant virulence in the rabbit, Pasteur ascertained that if a portion of the spinal cord were suspended in dry air the virulence slowly disappeared. In the earlier applications of the method to man a series of cords were used, beginning with one which had been dried for fourteen days and ending on the fourteenth or fifteenth day with one which had been dried for three days; it was found that this plan did not protect when the wound was severe and extensive, and the treatment, called intensive, now used in such wounds, extends until the twenty-first day. There appears to have been no recent thorough examination of statistics of the results of the Pasteur treatment, owing probably to the relatively small number of cases which have occurred in Western Europe in recent years. In India the disease is so much more common that the Government has established a series of Pasteur Institutes to which persons bitten by animals, chiefly dogs and jackals, proved or suspected to be rabid, are sent. In the report of the Pasteur Institute, Kasauli, for the year ending 1917 we find that 293 persons bitten or licked by animals proved to be rabid, were treated, with 6 deaths, a percentage rate of 2.05. It should be added that only 58 of these were bitten through clothing; of the others, 19 were bitten or licked on the head or face, and 216 on other parts of the body. Among 105 Europeans, 35 were bitten or licked on the head or face, and 93 on exposed parts of the body; there was only 1 death, a percentage rate of 0.95. Among 188 Indians, 14 were bitten or licked on the head or face, 123 on exposed parts of the body, and 51 were bitten through the clothing. There were 5 deaths, a percentage of 2.7.

EARLY RISING IN THE PUERPERIUM.

It is a common, but not perhaps wholly justified, complaint that the incidence of puerperal infection in private practice has not yielded as much as might have been expected to the introduction of antiseptic and aseptic technique in midwifery. Further improvement in this respect has been achieved by the reduction to a minimum of all digital interference with the genital tract, and by the more stringent supervision of the work of midwives, but still the evil remains. Dr. G. S. Thompson has written us from Sydney a forceful plea for the recognition of the importance of drainage of the puerperal uterus by posture as a preventive of uterine infection. He is, for this amongst other reasons, a strenuous advocate of early rising in the puerperium, and of elevation of the head of the patient's bed in cases in which that counsel is rejected or is deemed inapplicable. "The combination of twilight sleep and the erect position afterwards has robbed childbearing of its terrors and left health instead of disease and subsequent mutilations." The argument is obviously extreme, but it is wholly beneficial to be brought occasionally face to face with the question whether our methods of practice are all that they should be in the light of such knowledge as we have won. Nothing could be more inimical to progress than complacent satisfaction. This charge, however, cannot justly be levelled at obstetrical teachers; least of all because they recognize the dangers in the incautious adoption of drastic changes. "Twilight sleep," to which Dr. Thompson refers, is suffering the fate of all beneficent novelties. It is being discredited as the result of indiscriminate application. There are already in existence persons who may be said to practise twilight sleep, instead of, and not infrequently at the expense of, obstetrics. Sane and beneficent progress lies in a skilful application of the treatment to the fundamental principles of obstetric practice, and nothing but harm can follow the adoption of any treatment that permits those principles to be eclipsed, even temporarily. A considerable literature accumulated some years ago on the pros and cons of early rising in the puerperium. The "return to nature" argument has not proved the solid ground which it was believed to be. Medical missionaries and others have indicated that the women of races, in which it is customary for the puerpera to rise early after labour, are not less affected by puerperal infection, and are rather more prone to uterine displacements than are the women of more "civilized" races, who remain in bed for at least a week. The condition of the pelvic floor after labour is such that this is anything but surprising. The necessity for adequate drainage of the uterus and vagina is admitted on all hands, and Dr. Thompson's sweeping criticism would be justified only if the absolutely supine position were maintained throughout the puerperium. This, however, is not the case. A rational degree of rest in the puerperium enables the lacerations of the cervix and vagina to become healed and involution to proceed with little tendency to the formation of clots or profuse discharge. Most obstetricians combine with this the promotion of adequate drainage by propping up the head and shoulders after the second or third day, and by allowing the patient to sit up in bed after the fifth day. Dr. Thompson's argument is beneficial as a reminder of the fact that adequate drainage is an important factor in a healthy puerperium, and a valuable adjunct to treatment in puerperal infection. But it is not strong enough to warrant of itself a departure from a custom which has the authority of centuries behind it.

THE "VITAL RED" METHOD OF DETERMINING BLOOD VOLUME.

The method introduced by Keith, Rowntree, and Geraghty for ascertaining the quantity of blood in the circulation was referred to in the discussion on wound shock by Professor Bayliss and Dr. Dale, and as it has not yet found its way into textbooks a note on the method seems called for.[1] It consists in the introduction directly into the circulation of a measured quantity of a non-toxic, slowly absorbable dye, which remains in the plasma long enough for thorough mixing, and of the determination of its concentration in the plasma colorimetrically by comparison with a suitable standard mixture of dye and serum. The dye employed is "vital red" (disodium disulphonaphthol azotetramethyl triphenyl methane). Previous to injection 10 c.cm. of the patient's blood is withdrawn and the oxylated plasma kept for preparing the standard. Then a dilute solution of the dye is injected into the vein, the amount being calculated on the basis of 3 mg. of the dye per kilo of the body weight. Two samples of blood are withdrawn from the vein on the opposite side at intervals of three and six minutes respectively after the injection. The plasma of these two samples contains the red dye in unknown concentration. The original plasma diluted with three parts of normal

[1] See *Archives of Int. Med.*, 1915, p. 847.

saline solution is mixed with a convenient quantity of the dye solution, and the colorimetric reading is compared with those of the subsequently removed samples. A simple calculation gives the total volume of plasma in the circulation, and by employing the haematocrit the total blood volume is readily estimated. Traces of the dye appear in the urine after ten minutes, but considerable amounts can still be found in the circulation for several days afterwards, and as the dye is not taken up by the body cells or corpuscles to any appreciable extent during the short time necessary for the experiment a high degree of accuracy is claimed for the method. Repeated determinations on the same individual have yielded results practically identical. The plasma in normal individuals has been found to be approximately one twentieth of the body weight; the total blood constitutes 8.8 per cent., or approximately one twelfth of the total body weight. This is much higher than that given by the method of Haldane and Smith which has been so largely used in this country. In obesity the blood volume is considerably decreased below the normal, whilst many cases of anaemia show a relatively large plasma volume. In pregnancy before term there is a plethora. In some cases of polycythaemia there is a true plethora, and on the other hand marked hypertension may be accompanied by a low blood volume. In secondary shock, as Dr. Dale pointed out, the blood volume may be seriously decreased.

FEES FOR NOTIFICATION OF INFECTIOUS DISEASES.

As is well known, the notification fee was reduced from 2s. 6d. to 1s. under the Local Government (Emergency Provision) Act, 1916. It was a paltry piece of departmental economy, and from the first the British Medical Association protested against the reduction, and warned the Government of the light in which it would be regarded by the medical profession. On Friday, April 25th, Dr. Addison, the President of the Local Government Board, received a deputation from the British Medical Association on the question of the fee for the notification of infectious diseases. The deputation consisted of Mr. E. B. Turner, Chairman of the Medico-Political Committee, Dr. T. W. H. Garstang, Chairman of Representative Meetings, Dr. M. G. Biggs, Dr. Adam Fulton, Mr. N. Bishop Harman, Dr. J. P. Williams-Freeman, and the Deputy Medical Secretary. In introducing the deputation, Mr. Turner referred to the widespread desire of the profession that the notification fee should be restored to the pre-war level, and emphasized the indignation and resentment which the reduction of the fees had aroused throughout the whole profession. The members of the deputation protested strongly against the view that notification was a purely clerical matter, and gave numerous instances of the grave inadequacy of the present scale of fees in every class of practice. In reply, Dr. Addison said there was much force in many of the points made by the deputation. He did not personally wish to perpetuate any longer than he was compelled by existing statutes the difficult position created by the reduction of notification fees made by the Act of 1916; and he would make arrangements to revert to the pre-war scales as soon as possible. He could not at the present stage bind himself on points of detail, but he was happy to give the deputation this general indication of the course which he proposed to adopt. Dr. Addison promised to have inquiry made on certain points of detail which had been raised by the deputation—for example, the legal liability of a practitioner in the notification of certain classes of disease, and the number of forms of notification certificate now in use.

CLASSIFICATION OF TUBERCULOSIS.

A VERY outspoken report has been presented to his local committee by the tuberculosis officer for Middlesbrough, who for the last four years has been putting in force his experience of similar work in Western Australia. With refreshing candour he describes as futile the methods adopted in the North of England for the treatment of surgical tuberculosis, and asserts that archaic practice is only varied by entire neglect. The experience gained at the Cripples' Home at Alton, where 90 per cent. of the cases of spinal and hip disease are successfully treated, is, he thinks, disregarded, no effort being made to achieve a like result by the same means. It is clear that a more definite and uniform system of classification for the non-pulmonary forms of tuberculosis is greatly needed. Confusion too often arises from the statistical association of juvenile with surgical cases. A sharp line of demarcation has to be made between these forms and the incidence of tuberculosis of the lungs. In dealing with the latter, very satisfactory results have been obtained at Middlesbrough by the rigid limitation of residential treatment to the cases of early infection. Home visitation of the later and more advanced cases has had a distinct effect in checking the spread of the disease, in spite of the imperfection of notification. The chief outcome of the use of tuberculin in selected cases would appear to be the acquirement of a diminished liability to relapse during subsequent catarrhal attacks. Experience of the disease in general in the North of England tends to support the contention derived from statistical evidence, put forward in his report to the Research Committee by Dr. John Brownlee, upon which we commented last autumn,[1] to the effect that there must be many strains of tuberculosis, perhaps produced by differences in environment, and that vaccines and serums derived from one strain may be wholly inoperative in the presence of another. Herein may lie the explanation of the very contradictory results obtained by equally competent observers which have thrown doubt upon the efficacy of tuberculin treatment in general.

DR. JAMES NEAL.

IN response to the unanimous invitation of the Council of the Medical Defence Union, Dr. James Neal has accepted the post of General Secretary to the Union, which became vacant owing to the death of Dr. A. G. Bateman on April 9th. Dr. Neal has been Deputy Medical Secretary of the British Medical Association since 1912; for two years before that he was a member of the Central Ethical Committee of the Association, and represented the Birmingham Central Division in the Representative Body. He was a member of the State Sickness Insurance Committee in 1912, and a member of the first Advisory Committee set up under the National Insurance Act. During a large part of his twenty years' general practice in Birmingham Dr. Neal was honorary secretary of the Birmingham and District General Practitioners' Union, and Editor of the *Midland Medical Journal*. The Council of the Medical Defence Union is to be congratulated on its choice, but Dr. Neal's departure will be a loss to the central work of the Association, in which his sound judgement, long experience, and unfailing courtesy have won the respect of all.

THE report of the Registrar-General for the year 1917 has now been issued. We propose in an early issue to give a summary of the more important results contained in this admirably drawn up official analysis of vital statistics, which, in view of impending legislation, is of more than usual interest and significance.

A HUNTERIAN lecture on the surgical aspects of the collection and transport of the wounded will be delivered in the theatre of the Royal College of Surgeons of England on Tuesday, May 6th, at 5 o'clock, by Professor T. B. Layton, D.S.O., F.R.C.S., formerly officer commanding 2/4th London Field Ambulance. The lecture will be illustrated by the Palestine campaign, from the fall of Beersheba to the Es Salt raid, with photographs taken by the lecturer and others.

[1] BRITISH MEDICAL JOURNAL, September 28th, 1918.

SPECIAL CLINICAL AND SCIENTIFIC MEETING.

IN concluding the discussion on malaria in the Section of Preventive Medicine and Pathology, on April 11th, the chairman, Colonel Sir RONALD ROSS, K.C.B., K.C.M.G., F.R.S., Consultant in Malaria to the War Office and Ministry of Pensions, gave the following brief summary of war experiences in malaria, confining himself to points which might be specially useful in military and pension practice in the United Kingdom. This summary is still only provisional, because a number of reports are not even yet delivered, while others have not yet been abstracted and digested. In addition to the numerous papers published during the war in the medical press, two large official publications on malaria are in course of production—one prepared by the War Office, and one by the Salonica Expeditionary Force.

WAR EXPERIENCES OF MALARIA.

By Sir Ronald Ross.

Regarding the actual treatment of febrile attacks or relapses in malaria, I think that the following points have been pretty conclusively established:

1. Moderate doses of quinine—say, between 20 and 40 grains daily for adults—suffice in the vast majority of cases to reduce both fever and asexual parasites within two or three days.

2. I think that the sulphate, bisulphate, hydrochloride, and bihydrochloride of quinine are almost equally efficacious within narrow limits, but there may be clinical reasons for the occasional selection of one of these salts. Their elimination by the kidneys appears to be finally about equal.

3. Roughly, the same thing can be said regarding the three modes of administration—namely, orally, intramuscularly, and intravenously. Many prefer the third for rapid action, especially in first attacks, in serious attacks, and for other reasons. With much vomiting or gastro-intestinal disturbances the intramuscular and intravenous methods must be preferred; but many workers assert that the oral administration is generally as good, while it is obviously much more easily given. On the other hand, I have heard many "non-official" reports of occasional local mischief caused by the intramuscular injections; and, on the whole, see no reason why the oral administration should be superseded as a general broad procedure in malaria. Relapses occur with about equal frequency with all modes of administration after stoppage.

4. Rest in bed and good feeding are required during the attack and for about four days after the temperature returns to normal.

5. In first attacks and in complicated and serious attacks, larger doses than those mentioned in (1) above are very generally advocated by clinicians, but we have not had very much experience of such attacks in the United Kingdom, and I think that the point still requires more investigation.

6. Many think that the malignant parasite requires much more rest and continuous treatment after attacks than do the other species of parasite.

Regarding what I have somewhat tautologically called "anti-relapse prophylaxis," there is now a large amount of evidence to the effect that while men are actually taking about 60 to 90 grains of quinine every week their relapses will be infrequent, especially if the men are at the same time getting good food and a sufficient amount of exercise in the open air. The most remarkable case in proof of this occurred when many battalions were moved from the Salonica to the French front, and were subjected to a three months' course of such treatment under the strict supervision of Lieut.-Colonel Dalrymple, C.M.G., O.B.E., R.A.M.C. He succeeded in sending two whole divisions of these troops into the firing line, where the malarial factor became negligible. Similar results have been reported from English Malaria Concentration Centres by Captains Fraser and Cooke; and I am shortly communicating abstracts of the results in both these cases to the medical press. The essential points of this anti-relapse treatment are that quinine shall really be given, under strict discipline or supervision; that the patients shall be living a healthy, vigorous life and shall be well fed meanwhile. The treatment does not absolutely prevent all relapses, but certainly reduces their frequency while it is being given; it generally allows the men to recover weight, to lose anaemia and other secondary symptoms, and, in many cases, apparently to throw off the infection entirely by some unknown natural process of cure. The daily dosage is generally advisable for administrative reasons, but many observers suggest that the total weekly amount can be more effectively given only on two or three days a week, or that even smaller total amounts may be so administered with equal advantage. Decision on this point generally depends on local or special conditions. Many clinicians also like to add arsenic, iron, and other drugs to the quinine for the above purpose.

Regarding the absolute cure of malaria infection, I regret to say that the results have not been nearly so definite. Numerous "sterilizing" treatments have been tried, but none of them has yet proved certainly efficacious. As a rule very large doses of quinine—intramuscular, intravenous, oral, or combined—have been advocated, often associated with kharsivan and other preparations. I think that a large proportion of cures has sometimes followed; but, in view of the admirable effects of such a simple treatment as the anti-relapse prophylaxis outlined above, I doubt whether these sterilizing treatments are really justified. At the same time I do not wish to discourage in any way attempts to find a more satisfactory form of permanent cure.

The general result of all this, as regards military and pension practice, appears to me to be that cases of malaria should, after the treatment of the initial fever or relapse, be kept under anti-relapse quinine prophylaxis for about two or three months, or more if further relapses occur. In fact this is simply a return to the old clinical practice fairly universal throughout the tropics, and is like the treatment laid down in the War Office Provisional Instructions for the Treatment of Malaria [24/General Number/5500 (A.M.D.2), War Office, August, 1917].

Two other points may be mentioned. As a result of all these observations I am not at all sure that quinine acts at all as a direct poison to the parasites, but am inclined to suggest, though merely as a working hypothesis, that the drug only stimulates some natural antibody which destroys the parasites. The second point is that, as was suggested long ago, the parasites may be much influenced by season—that is, that relapses may be much more frequent and more difficult to cure at certain seasons than at others. We hope to have more evidence on this point later on.

Regarding blackwater fever, Staff Sergeant Nierenstein has made the important discovery that in certain individuals quinine may be changed into a highly haemolytic substance which he calls haemoquinic acid, and which is found in large quantity in blackwater urine (see *Journal of the R.A.M.C.*, March, 1919).

Regarding the prevention of malaria, there has been a very general consensus of opinion that the administration of quinine, even in doses of 20 grains daily, to healthy persons with a view to preventing their becoming infected, has been very largely a failure. Many medical officers think also that this so-called quinine prophylaxis renders infections more difficult to treat when they occur. I am very sorry for this, as hitherto quinine prophylaxis has been generally adopted as one of the great weapons against the disease. Probably its previous acceptation was due to a confusion between true quinine prophylaxis, that is, quinine given to healthy persons, and anti-relapse quinine prophylaxis, that is, quinine given to infected persons for the purpose of preventing relapses. The former appears to be inefficient, the latter to be most efficient; and I suspect that the good results so often claimed for quinine in the reduction of the malaria rate of localities was due to the latter and not to the former.

If the failure of true quinine prophylaxis is finally accepted, a great change must be made in the prophylaxis of malaria in general, and we shall have to rely more than ever on mosquito reduction and mechanical protection. I will conclude by mentioning the admirable results obtained by Colonel Robertson, C.M.G., C.I.E., I.M.S., at Taranto. Last year only one case occurred in that camp owing to the careful mosquito reduction adopted by him and the officers of the camp.

I should have liked to mention a vast amount of other excellent work done by officers of the army during the war, but have no time to do so—and it would be invidious merely to refer to a few special cases.

The Pensions Ministry, acting in association with the Medical Research Committee, is organizing a large scheme for the treatment of demobilized soldiers affected with malaria. There are, of course, in this country many medical men who will be called upon to treat malaria, and I hope that the above remarks will be useful to them. Further details have been given in a paper prepared by Colonel James of the Local Government Board and myself; and I propose to circulate other information from time to time to the medical press. It must be the object of all to reduce relapses as much as possible among the men, in order to enable them to do their civilian work. If they take the anti-relapse prophylaxis as described above, I am sure that most of them will gradually lose their infection entirely and recover completely.

DEMONSTRATIONS.

MALARIA.

FOLLOWING the discussion on malaria on Friday morning an instructive demonstration was given in a room adjoining the lecture theatre by Sir Ronald Ross and his colleagues. Blood films, histological specimens, charts, etc., were shown, illustrative of the various phases in the life-history of the parasites and culture of the earlier phases also. This aroused much interest, and those members who could not manage to attend the demonstration on the Wednesday at Endsleigh Palace Hotel had an opportunity of studying the subject.

MODERN METHODS OF TREATING VENEREAL DISEASE.

The demonstrations on venereal disease organized by Brevet Colonel L. W. Harrison took place on the afternoons of April 9th, 10th, and 11th. In order to prevent overcrowding each demonstration was organized in three sections, and visitors were similarly divided into three parties, visiting each section in turn.

In Section A, Mr. C. H. Mills demonstrated the system on which syphilis is managed, commencing with the examination of a stripped patient and recording of notes, and the graphic representation of the lesion on a special treatment card. The aim in all early cases is to make the diagnosis and commence treatment as quickly as possible, and, in order to save time, specimens for microscopic examination are not sent to the laboratory but examined on the spot. Specimens of spirochaetes were demonstrated in the adjoining room used for this purpose. There was also shown in a room used for injections all the methods employed in antisyphilitic treatment. These included the various steps in the preparation of "606" for injection up to the point where the needle is inserted into the vein. There was also demonstrated the intravenous injection of "914" in concentrated solution and the method of preparing "914" for intramuscular injection. This is now done by making an emulsion of the "914" solution (very concentrated) with a special "creo-camph." cream basis which is anaesthetic. Luargol was also shown and the demonstration included the detection of good and bad ampoules of arsenobenzol preparations. The technique of intramuscular injection of mercury was also shown.

In Section B, Captain Doble demonstrated the outfit used for the early preventive treatment of venereal disease in the army. This includes a small tube of calomel cream for instillation into the urethra, as well as for inunction of the parts, and a small bottle of 1 in 1,000 potassium permanganate solution. He also demonstrated the various methods employed in the abortive treatment of gonorrhoea. Captain T. Osmond demonstrated apparatus used in the diagnosis and treatment of chronic gonorrhoea, as well as the routine treatment of ordinary cases.

In Section C, Captain D. Thomson demonstrated the preparation of detoxicated vaccines and illustrated their effects by a wall diagram showing the effect of various types of vaccine on the complement fixing power of the serum of the inoculated patient. The diagram showed clearly the superior effect of detoxicated gonococcal vaccines in raising the patient's resistance. Captain Thomson also demonstrated the complement fixation test in gonococcal infections. Lieutenant Burnet showed a number of microscopical specimens, stained and under dark-ground illumination, illustrating the various micro-organisms found in cases of venereal disease. He also illustrated by wall diagrams and actual tests the general principles of complement fixation. Mr. N. C. Clark demonstrated the Wassermann test in all its stages.

The demonstrations on venereal disease were attended by 298 visitors, many of whom expressed their keen appreciation of what they had seen. Ample opportunity was afforded for informal discussions on various points, and the various demonstrators were kept very busy answering questions.

England and Wales.

THE DOGS' BILL.

AT a special meeting of the Fellows of the Royal Society of Medicine on April 28th, when the President, Surgeon Rear Admiral Sir Humphry Rolleston, K.C.B., was in the chair, the following resolution was unanimously passed:

> That the Royal Society of Medicine, representing as it does every branch of the medical profession throughout the Empire, and with full knowledge of the grave issues involved, feels bound to place on record its earnest hope that the Dogs' Protection Bill will not pass into law, as, if enacted, it will place this country at a great disadvantage as compared with all other civilized countries, and will practically compel our ablest workers to seek opportunities for preventive and curative research abroad.

ANTIRABIC TREATMENT.

In the JOURNAL of January 11th, 1919, we printed the substance of a revised memorandum issued by the Local Government Board on the procedure recommended to be followed when persons are bitten by dogs suspected of being rabid. At that time specific antirabic treatment was obtainable only at Plymouth. As we announced last week, in consequence of the appearance of rabies in dogs in the neighbourhood of London, antirabic treatment is now obtainable in London as well as at Plymouth, with material specially supplied for the purpose by the Director of the Pasteur Institute in Paris. The Local Government Board issued on April 28th a revised edition of its memorandum. The procedure has been modified in the light of the facts which we published last week. When, after communicating with the Local Government Board in the manner directed, the medical officer of health is satisfied that antirabic treatment is essential, and has ascertained that the person bitten is prepared to begin the treatment, he will communicate with Dr. L. S. Dudgeon, Department of Pathology, St. Thomas's Hospital, or with Dr. W. L. Pethybridge, 11, Whitefield Terrace, Plymouth, as the case may be, and all arrangements for the attendance of cases must be made through him. A copy of the revised memorandum has been forwarded to medical officers of health, who can obtain further copies for distribution to medical practitioners on application to the Local Government Board. As already announced, local authorities are empowered to pay expenses in cases where persons needing antirabic treatment cannot stay in London, or at Plymouth, at their own expense for the two or three weeks' course of specific treatment.

Scotland.

THE SUMMER TERM.

THE summer term opened on April 22nd. On April 24th the number of matriculated students at Edinburgh was 3,254. In 1913–14 the number was 3,283, so that the pre-war total will be probably reached this year, if not passed. A large number of overseas soldiers are taking advantage of the special courses arranged. At Glasgow over 200 ex-service students have enrolled themselves in the faculty of medicine for the summer classes of the first year, with the result that the existing accommodation at the university is altogether inadequate. Temporary arrangements have been made with the Royal Technical College for additional university courses in physics and botany. There is immediate need of provision for additional teachers and demonstrators, and of space and equipment for lectures and laboratory work in the later subjects of the medical course. The resources of the university are insufficient to meet the cost, and representations have been made to the Government, in association with other universities, in order that

the responsibilities of the universities, not only to ex-service students, but to students of the Overseas Dominions and from America, shall be met. The Business Committee of the General Council of the University of Glasgow proposes to consider and report upon the whole question of the medical curriculum, including post-graduate teaching; the alternatives are said to be either to unload the overburdened curriculum or to add another year to it.

Stillbirths Statistics in Edinburgh.

The health authorities in Edinburgh do not furnish statistics regarding stillbirths in the reports regarding the birth-rate, infantile death-rate, ordinary mortality rate, etc., which appear weekly in the newspapers. The reason is that the latter rates are obtained from registration whilst the stillbirths are got from notification returns; if they were published together there would be apparent discrepancies. At the same time, the importance of reporting the stillbirths and of comparing the rate from month to month is obvious, and an arrangement has been made whereby the number of these antenatal and intranatal disasters will be furnished each month. During January the number of births notified in the city of Edinburgh was 460; this number included 14 stillbirths, and the stillbirths rate was therefore 30.43 per 1,000. In February the number of notified births was 275, including 5 stillbirths; the stillbirths rate for the month was therefore 18.18 per 1,000. In March the number of notified births was 405, including 15 stillbirths; the rate for March therefore worked out at 37.03 per 1,000. It is to be noted that stillbirths are not included in the number of the registered births upon which the birth-rate is founded; neither are they considered in the infantile and neonatal death-rates.

Ireland.

The Dogs' Bill.

At a meeting of the Dublin branch of the Research Defence Society, to express disapproval of the Dogs' Protection Bill, the Archbishop of Dublin, who presided, said that the supporters of the bill adopted the position that, no matter what benefits might accrue to mankind, experiments on dogs or other animals should not be carried out if any degree of pain or sickness was inflicted upon the animals. His reply was that there was no scale by which the value of a man and of a dog could be determined; there was a difference which could not be bridged between a dog's life and a man's, and to insist on the position assumed by the advocates of the bill was immoral. On the motion of Dr. J. O'Carroll, president of the Royal College of Physicians of Ireland, seconded by Sir Robert H. Woods, M.P., and supported by Mr. J. B. Story, president of the Royal College of Surgeons in Ireland, Colonel A. C. O'Sullivan, professor of pathology in Trinity College, Rev. Denham Osborne, and Sir John Moore, a resolution was unanimously carried calling upon Parliament to reject any bill that, by the prevention of experiments on dogs under proper safeguards, would hamper medical science and retard the progress of knowledge.

Medical Vacancies in Cashel Union.

The Local Government Board has forwarded to the Cashel guardians a circular letter stating that it had withdrawn the prohibition contained in the circular of November, 1915, and requesting the guardians as soon as may be convenient to take the prescribed steps towards filling up any vacancies existing in the medical staff of the union. The following order was made:

Advertise for permanent medical officers for Fethard and Kilpatrick dispensary districts, and also for workhouse, the former at a salary of £160 per year, and the workhouse at a salary of £120, with triennial increments of £10 in each case to a maximum of £200, subject to the Local Government Board's approval. The dispensary medical officers to receive £20 a year each as medical officers of health. The appointments will be made to comply with the regulations of the Local Government Board, who sanctioned the existing appointments only for the period of the war. Guardians to be notified that the appointments will be made at the guardians' meeting on April 10th, 1919.

Correspondence.

PORTRAIT OF SIR CLIFFORD ALLBUTT.

Sir,—Sir Clifford Allbutt has accepted an invitation to allow the profession to present to him a portrait of himself painted by an eminent artist. The Council of the British Medical Association has taken the initiative in the matter because Sir Clifford Allbutt has been President of the Association during the years of the war, and will preside over its Annual Meeting in Cambridge next year. The esteem due to Sir Clifford Allbutt's attainments and the warm affection inspired by his character are such that very many, both within and without the Association, will desire to share in this tribute to one whose career has reflected so much honour on medicine in England. This desire will not be limited to his many pupils, first in Leeds and afterwards in Cambridge, nor to the grateful members of the Association over which he has presided during the past five years.

Subscriptions are invited from all members of the profession. The amount is limited to one guinea, and the Treasurer of the British Medical Association, 429, Strand, London, W.C.2, is now prepared to receive subscriptions of one guinea or less. Cheques and postal orders should be made payable to the "Sir Clifford Allbutt Presentation Fund," and crossed London County, Westminster, and Parr's Bank.—We are, etc.,

J. A. Macdonald,
Chairman of Council.

T. W. H. Garstang,
Chairman of Representative Meeting.

G. E. Haslip,
Treasurer.

British Medical Association, 429, Strand, W.C.

R.A.M.C. WAR MEMORIAL.

Sir,—Very many officers and men, past and present, of all branches of the Royal Army Medical Corps have recently expressed the view that a memorial should be erected to those officers and men of all branches of the corps who have fallen in this war. These number 560 officers, 4,091 other ranks. A committee composed as follows was formed for the purpose of considering the matter:

Chairman: Lieut.-General Sir Alfred Keogh, G.C.B., G.C.V.O., C.H., M.D., F.R.C.P.
Vice-Chairman: Lieut.-General Sir John Goodwin, K.C.B., C.M.G., D.S.O., K.H.S.
Secretary: Captain A. R. Wright, D.S.O.

Regular Army:
Lieut.-General Sir Arthur Sloggett, Kt., K.C.B., K.C.M.G., K.C.V.O., K.H.S.
Lieut.-General Sir Launcelotte Gubbins, K.C.B., M.V.O.
Major-General S. Macdonald, C.B. C.M.G., K.H.P.
Major-General Sir H. R. Whitehead, K.C.B.
Major-General Sir W. G. Macpherson, K.C.M.G., C.B.
Colonel C. R. Tyrrell, C.B.
Colonel O. L. Robinson, C.M.G., K.H.P.
Bt.-Colonel Sir E. Worthington, Kt., K.C.V.O., C.M.G.
Major J. St.A. Maughan, D.S.O.
Captain R. E. Todd.
A sergeant major.
A staff-sergeant.
A private.

Territorial Force:
Major-General Sir Berkeley Moynihan, Kt., K.C.M.G., C.B., F.R.C.S.
Colonel A. D. Sharp, C.B., C.M.G., F.R.C.S.
Lieut.-Colonel A. M. Macintosh, M.B., F.R.C.S.
Major E. B. Waggett, D.S.O.
Captain G. T. Willan, D.S.O.

Special Reserve:
Lieut.-Colonel A. A. Watson, D.S.O.
Major S. G. McAllum, M.D.
Captain J. G. McCutcheon, M.B.

Temporary Commissioned Officers:
Colonel Sir T. Crisp English, K.C.M.G., M.B., F.R.C.S.
Major P. Turner, M.B., F.R.C.S.
Captain A. R. Owst, F.R.C.S.

Consultants:
Major-General Sir George Makins, G.C.M.G., C.B., F.R.C.S.
Major-General Sir Bertrand Dawson, G.C.V.O., C.B., M.D.
Major-General Sir Anthony Bowlby, Knt., K.C.M.G., K.C.V.O., C.B., F.R.C.S.
Brevet Colonel Sir W. Hale White, K.B.E., M.D.
Sir Norman Moore, Bt., M.D., President Royal College of Physicians.

Ireland: Colonel W. Taylor, M.B., F.R.C.S.

Scotland:
Colonel H. M. W. Gray, C.B., C.M.G., F.R.C.S.
Colonel Sir H. Stiles.

It will be seen that the committee contains representatives of the Regular, Territorial, Special Reserve, and Temporary Commissioned Officers. This committee has recommended:

1. That a permanent memorial or monument be erected in London, with, if possible, replicas in Dublin and Edinburgh.

2. That a fund be formed from which grants in aid be given to the families of officers, non-commissioned officers, and men of all branches of the Royal Army Medical Corps who have fallen or been disabled in this war, or who may be in necessitous circumstances owing to the exigencies of military service.

3. That scholarships or memorial prizes for officers and men of the Royal Army Medical Corps be founded for research work.

Field Marshal H.R.H. The Duke of Connaught, K.G., has graciously consented to be Honorary Chairman of the Committee.

There is reason to believe that others outside the Royal Army Medical Corps are desirous of being permitted to subscribe to this memorial. It is therefore proposed not to limit subscribers to officers and men who have served with the Corps but to accept subscriptions from individuals who may be sympathetic with the object and wish for various reasons to take part in the project.

In order to attain the objects aimed at in an adequate manner a considerable sum of money will be necessary.

During the course of the war 17,338 officers and 179,711 other ranks have served in or with the corps. There is, therefore, confidence that an amount commensurate with the needs will be obtained if the project can be brought to the notice of all now serving and of those who have returned to their civil occupations, as well as to the notice of members of the general public who may be desirous of subscribing. Subscriptions may be sent to Messrs. Holt and Co., 3, Whitehall Place, and marked R.A.M.C. War Memorial Fund.—I am, etc.,

T. H. J. GOODWIN,
Lieut.-General, Director-General Army Medical Service.

War Office, Adastral House,
Victoria Embankment, E.C.4.
April 28th.

HYPNOTISM, SUGGESTION, AND DISSOCIATION.

SIR,—Dr. W. Brown is good enough to inform the readers of *The Times* (in other words) that my medical knowledge and practice are forty years behind the time, and that I am ignorant of the dissociation hypothesis, which he calls both a theory and a fact, and which he is so good as to explain to me. The columns of *The Times* are not very appropriate for a medical discussion, and with your permission I will change the venue.

It is no doubt a fact—or a theory—that I am a superannuated old fogy, unentitled to give myself airs on the ground of being up to date; but I have not been asleep during the whole of the last forty years, and in fact—or theory—in my waking moments I attended the birth of the dissociation hypothesis, discussed it with its author, reviewed his book, and have watched the career of the theory—or fact—ever since; and I still keep by me that suit of mourning in which I have followed so many medical theories—or facts—to the cemetery.

Youth will be served, and I accept meekly Dr. Brown's suggestion of my old-fogydom, but I am haunted by the words of another and still older fogy: "Doubtless," said he to the Dr. Browns who were trying to bring him up to date, "doubtless ye are the people, and wisdom will die with you. But I have understanding as well as you. . . . Yea, who knoweth not such things as these?"—I am, etc.,

Parkstone, Dorset, April 28th. CHAS. MERCIER.

FACTORY MEDICAL OFFICERS.

SIR,—May I beg the hospitality of your correspondence columns in order to ask those of our colleagues who, like myself, have been, or are, full time medical officers to factories, whether, in view of the probable development of a widespread (but not necessarily State) medical service, they consider it would be desirable to form a small association for our mutual help and for profitable discussion of the problems of which we alone fully realize the immense importance to the nation, the factory, and the worker?

A provisional committee has been formed, and it is hoped that a meeting may be arranged at an early date. I am acting as secretary for the occasion, and so shall be very glad to hear from any or all of them their views on this matter. Perhaps later on we may encourage the managerial element to join us, as so much good for the factory and workers results from friendly discussion between the medical and other heads of departments, that it will be worth while developing this principle on a larger scale, the main result of which should be the education of the lay element in the sound principles of medical supervision of the health and energy of the industrial worker, especially whilst at work.—I am, etc.,

H. GEORGE P. CASTELLAIN, M.A., M.D.,
Medical Inspector to Ministry of Pensions, formerly P.M.O. to Nos. 6, 13, and 14, National Shell Filling Factories.

London, S.W.1., April 25th.

*** It would, we suggest, be desirable that further particulars should be given of the scope of this proposed new society. There is already a Certifying Factory Surgeons' Association, and the multiplication of medical organizations to deal with the same medical field is not free from objection.

WELSH MEDICAL COMMITTEE.

SIR,—The Association had just before the outbreak of the war finally decided to establish a Welsh Medical Committee on precisely similar lines to the Irish and Scottish Committees. For certain reasons connected with the war the scheme was not put into operation at the time.

The moment, however, is now opportune, and indeed clamant, to call this statutory committee into active being, for Parliament has very properly decided that Wales must have under the Ministry of Health Act a separate Board of Health, to be located in Wales itself, such Welsh Health Board to deal with National Insurance, housing, and all other health matters in their bearing on the Principality.

When established, such Welsh Medical Committee could immediately enter into dealings with the Welsh Health Board on all health matters appertaining to Wales.

When then, Sir, shall we hear of the Welsh Medical Committee of the British Medical Association holding its first meeting?—I am, etc.,

E. LLOYD OWEN, M.D.,
M.O.H. for South Carnarvonshire.

Criccieth, April 21st.

*** At its meeting on April 16th the Council of the British Medical Association decided, on the recommendation of the Organization Committee, that the Welsh Committee which has not been called together during the war, should meet at an early date and that the Medical Secretary should attend the first meeting.

Universities and Colleges.

UNIVERSITY OF DUBLIN.

THE following medical degrees were conferred on April 24th:

M.B., B.Ch., B.A.O.—J. J. G. De Kock, Rita Henry, J. E. Hill, J. T. Mynhardt, R. Resneskov, R. B. N. Smartt, F. J. Smith, A. J. Vorster, A. L. Wilson.
M.D.—J. Colgan, C. D. Pile, J. Speares, G. F. Wicht.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.

AN ordinary comitia was held on Thursday, April 24th, at 5 p.m., the President, Dr. Norman Moore, occupying the chair.

On the report of the Censors Board, the name of Mr. Thomas Stoney Sharpley was expunged from the list of Licentiates.

The following candidates, having passed the required examination, were elected as Members:

Alfred Douglas Bigland, M.D.Liverpool; Hugh Hadfield Carleton, M.D.Oxf.; Walter d'Esté Emery, M.D.Lond.; Charles Leonard Gimblett, M.D.Camb.; Wm. Henry Parkes, M.B.Edin.; John Alfred Ryle, M.B.Lond.; Alfred Bertram Soltau, M.D.Lond.; John Forbes Ward, M.B.Manch.

Licences to practise physic were granted to 76 candidates who, having conformed to the by-laws and regulations, had passed the required examinations.

The following Members were elected to the Fellowship on the nomination of the Council:

John Douglas Stanley, M.D.Edin.; Ernest Bosdin Leech, M.D.Camb.; Henry Devine, M.D.Lond.; Henry Letheby Tidy, M.D.Oxf.; George Augustus Auden, M.D.Camb.; David Henriques De Souza, M.D.Lond.; Alexander Edward Gow, M.D.Lond.; Cuthbert Allan Sprawson, M.D.Lond.; Frederic Percival Mackie, M.D.Bristol; Albert Ernest Naish, M.D.Camb.; Robert Skeogh Frew, M.D.Edin.; George Herbert Hunt, M.D.Oxf.; Philip Hamill, M.D.Camb.; James Leatham Birley, O.B.E., M.B.Oxf.

Dr. Sidney Martin was appointed, on the nomination of the Council, a representative of the College on the Senate of the University of London.

On the recommendation of the Committee of Management, approval was given to the addition of St. Peter's School, York, to the list of institutions recognized for instruction in chemistry and physics, and of the Perse School for Girls, Cambridge, for instruction in chemistry, physics, and biology; also of the addition of the University of Texas to the list of institutions whose graduates in medicine are admissible to the Final Examination of the Examining Board in England under paragraph IV, Section III, of the Regulations.

Books and other publications presented to the library during the last quarter were received and the thanks of the College accorded to the donors.

After some formal business the President dissolved the comitia.

The Services.

CREATION OF DIRECTORATES OF HYGIENE AND PATHOLOGY WITHIN THE ARMY MEDICAL DEPARTMENT.

THE sanction of the Treasury has just been given to a scheme put forward by the Director-General, Army Medical Service, with a view to linking up, under a definitely planned organization, the activities of the different departments and individuals hitherto concerned with the various problems of preventive medicine, pathology, and tropical diseases, bearing upon the health of the army in peace and war.

The need for such a reorganization had long been felt by many of those officers of the R.A.M.C. engaged in hygienic or pathological work, and efforts had already been made, prior to the war, towards an improved system. It was not, however, until the progress of the war brought wider recognition of the far-reaching benefits of scientific research, and a fuller realization of the amount of training, work, and organization required to obtain the best results from such research, that the urgent need for a better system became manifest.

The principal objects which were in view in the formulation of the scheme outlined below were as follows: (1) To utilize to the fullest extent the benefits of new knowledge, as these become available, through close co-operation between those working within and outside the army, and by initiating and controlling research work in connexion with problems affecting the health of the troops. (2) To raise the standard of sanitary and pathological work in the army by creating within the Army Medical Department such an organization as will ensure this co-operation, and will at the same time furnish inducement to officers who have specialized in these subjects to continue to work therein. It is also hoped that the improved prospects now opening up may encourage young medical men whose bent and inclinations lie in these directions to enter the service.

The scheme to which approval has now been given may be outlined as follows:

1. Two new Directorates, of Hygiene and Pathology respectively, have been created under the Director-General, Army Medical Services, as a part of the War Office organization of the Army Medical Department. These Directorates will be directly responsible to the Director-General for all matters relating to their respective spheres, and they will take over from the various branches of the Army Medical Department the sections of this work which have hitherto been distributed among those branches.

2. The following administrative staff appointments have been authorized, conforming as regards conditions of appointment and tenure to those of D.M.S., D.D.M.S., A.D.M.S., and D.A.D.M.S.

(*a*) Director of Hygiene (D.H.).; Director of Pathology (D.P.).
(*b*) Deputy Director of Hygiene (D.D.H.).; Deputy Director of Pathology (D.D.P.).
(*c*) Assistant Director of Hygiene (A.D.H.).; Assistant Director of Pathology (A.D.P.).
(*d*) Deputy Assistant Director of Hygiene (D.A.D.H.).; Deputy Assistant Director of Pathology (D.A.D.P.).

3. The above appointments will carry with them the following ranks:

(*a*) Directors—Brigadier-General (but may be held by a Major-General if selected for promotion to this rank in the ordinary course).
(*b*) Deputy Directors—Colonel.
(*c*) Assistant Directors—Lieutenant-Colonel.
(*d*) Deputy Assistant Directors—Major.

Officers selected for appointment to any of these charges, if not already holding the substantive ranks indicated, will be given the appropriate temporary rank, together with the pay and allowances of that rank, for as long as the appointment is held.

4. *Establishment.*—Sanction has been given to the new Directorates and to the following establishment of the cadres in the Commands for a period of two years, at the end of which time the latter will be subject to revision in the light of the experience by that time acquired as to its adequacy. The appointments will be filled up as soon as the final disposition and strength of the troops to be stationed at home and abroad have been settled, and as suitably qualified officers become available.

War Office:

Hygiene.	Pathology.
1 Director.	1 Director.
1 Deputy director.	1 Deputy director.
1 Assistant director.	1 Assistant director.

Home (exclusive of professional staff of R.A.M. College):

9 Assistant directors.	8 Assistant directors.
21 Deputy assistant directors.	17 Deputy assistant directors.

Abroad (excluding India):

1 Assistant director.	1 Assistant director.
6 Deputy assistant directors.	8 Deputy assistant directors.*

* Of whom 5 will also act as D.A.D.'s of Hygiene.

5. *Advisory Committee.*—It has been decided to appoint such Committees in connexion with each Directorate to assist the Director in technical matters. They will be composed of both military and civilian members, and the following are the constitutions which have been approved:

(*a*) *Hygiene Advisory Committee.*
The Director of Hygiene (Chairman).
The Deputy Director of Hygiene (Vice-Chairman).
The Professor of Hygiene at the R.A.M. College.
A representative of the War Office Directorate of Fortifications and Works.
A sanitary engineer.
A civil professor of hygiene or M.O.H. of a county or large city.
A physiologist.
A representative of the Medical Department of the Local Government Board.

(*b*) *Pathological Advisory Committee.*
The Director of Pathology (Chairman).
The Deputy Director of Pathology (Vice-Chairman).
The Professor of Pathology, R.A.M. College.
The Professor of Tropical Medicine, R.A.M. College.
Two civilian professors or recognized experts in pathology.
A civilian professor or expert in tropical medicine.
A representative of the Medical Research Committee.

6. *Organization for War.*—A similar scheme for the co-ordination of hygiene and pathology work in the field, together with the establishments considered necessary under various circumstances, has also been drawn up, but need not be described here.

EAST AFRICAN CAMPAIGN.

LIEUT.-GENERAL SIR J. L. VAN DEVENTER, Commander-in-Chief, East African Force, in his dispatch dated Pretoria, January 20th, 1919, regarding the operations in East Africa from September 1st, 1918, to the conclusion of hostilities, after referring to the progress made by the troops under his command, says:

Perhaps the greatest problem of all was that of health. No country is more rife with disease than tropical Africa, our greatest enemy being malaria, which thinned the ranks of the force to an alarming extent. Towards the end of the campaign, also, the troops suffered severely from Spanish influenza. These and other diseases filled our hospitals to an extent which taxed the medical services to the utmost; and, in spite of all their care and devotion, claimed a far larger number of victims than the weapons of the enemy.

INDIAN MEDICAL SERVICE.

NEW RATES OF PAY (MILITARY).

THE Secretary of State for India in Council, in announcing recently to the deputation from the British Medical Association the introduction, with effect from December 1st, 1918, of improvements in the rates of pay for permanent officers of the Indian Medical Service, stated that the detailed rates of pay to give effect to this decision were being worked out in India.

The detailed rates of pay for the military side have now been received, and are as follows (the rates of pay in force before December 1st, 1918, for officers in permanent medical charge of regiments are given in column 2 for comparison):

	(1) New Rate.	(2) Old Rate for Charge of a Regiment.
	Rs. p.m.	Rs. p.m.
Lieutenants	550	(450)*
Captains...	700	(550)
Captains (after 5 years' total service)...	750	(600)
Captains after (7 years' total service)...	800	(650)
Captains (after 10 years' total service)...	900	(700)
Majors	1,000	(800)
Majors (after 3 years' service as such)...	1,150	(900)
Lieut.-Colonels	1,550	(1,250)
Lieut.-Colonels (of over 25 years' service)	1,600	(1,300)
Lieut.-Colonels (selected for increased pay)	1,750	(1,400)

These rates are consolidated, and include charge pay for the command of station hospitals.

The new rates of pay for certain of the higher military appointments are as follows:

	Rs. p.m.
D.D.M.S. (if held by a Major-General)	2,650
D.D.M.S. and A.D.M.S. (if held by a Colonel)	2,150
A.D.M.S. of Aden: Inspector of Medical Services, Army Headquarters	1,950
A.D.M.S. in the Field (when held by an officer below Colonel's rank)	
Officer Commanding general hospital in the field of 500 beds	
A.D.M.S., Army Headquarters	1,700

(These new rates have been arrived at by adding approximately 33⅓ per cent. to that portion of the old rates of consolidated pay for these appointments which represented grade pay.)

The detailed rates of civil pay are not yet available, but it is hoped to announce them shortly.

Adjustments of pay to give effect to the new rates will be carried out as soon as possible.

*In the case of a Lieutenant the rate for an officer in officiating charge only has been shown, as this is the most probable position of a Lieutenant.

Obituary.

WILLIAM GEMMELL, M.B., C.M., F.S.A.SCOT.

MUCH regret is felt by the medical profession in Glasgow at the death of Dr. William Gemmell, at the age of 59, which took place on April 2nd in the Western Infirmary as the result of injuries caused by a motor cycle. Dr. Gemmell was a well known and greatly respected personality in Glasgow, where he was born and educated, and whither he returned after some twenty years' practice in London. He studied medicine in the university, and having graduated M.B., C.M. in 1888, he held resident posts at the Glasgow Royal Infirmary, at the Maternity Hospital, and the Belvidere Hospital. On his retirement from active practice he devoted himself to public work and to literary and antiquarian pursuits, for which he had always had a strong taste. In 1912 he was elected a town councillor and five years later a magistrate of the city. He was a Fellow of the Society of Antiquaries of Scotland and president of the Grand Antiquity Society of Glasgow, and was a recognized authority on the ancient buildings and monuments of Glasgow, upon which he published more than one interesting and learned volume. He took a prominent part in the discussions of the Glasgow Archaeological Society, and in 1911 he organized the domestic section in the Palace of History at the Scottish Exhibition. Beyond his ordinary civic duties as a town councillor, Dr. Gemmell served as convener of the Libraries Committee of the Glasgow Corporation. During the war he received leave of absence from the corporation in order to undertake military duties as a captain in the R.A.M.C.

DR. JAMES HINSHELWOOD, formerly lecturer on ophthalmology at the Glasgow Western Medical School and surgeon to the Glasgow Eye Infirmary, died recently at Mentone at the age of 60. He was a native of Glasgow, and received his medical education at the University of Glasgow, where he graduated M.A. in 1880, M.B., C.M. in 1884, and M.D. with commendation in 1899. In 1896 he was elected a Fellow of the Royal Faculty of Physicians and Surgeons of Glasgow. He made a number of contributions to the literature of ophthalmology, and was the author of *Letter-, Word-, and Mind-Blindness*, published in 1900. He was honorary secretary of the medical section of the Glasgow Medico-Chirurgical Society and a member of the Glasgow Philosophical Society and of the Glasgow Central Division of the British Medical Association.

DR. ROBERT A. NESHAM, of Newcastle-upon-Tyne, died on February 5th in his 50th year. He was educated at Cambridge University, where he graduated B.A. in 1890 and at St. Bartholomew's Hospital. He took the diplomas of M.R.C.S., L.R.C.P.Lond. in 1896, after which he went into practice at Newcastle-on-Tyne, where he was honorary physician-accoucheur to the Lying-in Hospital, examiner to the Central Midwives Board and examiner under the Workmen's Compensation Act for Elswick Works. He joined the 1st Northumbrian Brigade of the Royal Field Artillery Volunteers as medical officer in February, 1900, attained the rank of surgeon-major in May, 1915, and subsequently retired. He was a member of the Newcastle Division of the British Medical Association.

CAPTAIN JAMES CONNOR MAXWELL BAILEY, O.B.E., R.A.M.C., died in German East Africa on April 13th, aged 40. He was the only son of Mr. L. F. Bailey of Dulwich, and was educated at St. Bartholomew's Hospital, taking the M.R.C.S. and L.R.C.P.Lond. and also the M.B. Lond. in 1901 and the M.D. in 1909. After serving as house-surgeon, gynaecological house-surgeon, and senior house-physician at the West London Hospital, he joined the West African Medical Staff and served in South Nigeria. He took a temporary commission as lieutenant in the R.A.M.C. on March 1st, 1916, and was promoted to captain after a year's service. At the time of his death he held the post of principal medical officer in German East Africa. He received the O.B.E. on January 1st 1919.

CAPTAIN WILFRID STEPHENSON BROWN, R.A.M.C.(S.R.), died on March 27th, on his way home from Mesopotamia, of disease contracted on active service. He was the eldest son of Mr. R. Allen Brown of Bickley, Kent, and was educated at Caius College, Cambridge, where he graduated B.A., and at St. Thomas's Hospital, taking the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1916. He joined the Special Reserve of the R.A.M.C. as lieutenant in 1917, and was promoted to captain on February 14th, 1918.

Medical News.

COLONEL WILLIAM HENRY WILLCOX, C.B., C.M.G., M.D., has been appointed a Knight of Grace of the Order of the Hospital of St. John of Jerusalem.

A QUARTERLY meeting of the Medico-Psychological Association will be held at 11, Chandos Street, Cavendish Square, London, on the afternoon of May 20th, when Dr. C. F. F. McDowall (Ticehurst, Sussex) will read a paper entitled "The Genesis of Delusions: Clinical Notes."

COLONEL A. W. SHEEN, C.B.E., having relinquished the appointment of consulting surgeon, war hospitals, India, has returned to Cardiff, and Dr. Hildred Carlill, on demobilization from the Royal Navy, to London (146, Harley Street).

AT a pathological meeting of the West London Medico-Chirurgical Society to be held to-day, Friday, May 2nd, at 8 p.m. at the West London Hospital, Dr. J. M. Burnford will read a paper on clinical pathology: its importance in diagnosis and treatment. The annual general dinner of the society will be held on Thursday, July 10th.

A POST-GRADUATE course in neurology will be held at the National Hospital for the Paralysed and Epileptic, Queen Square, Bloomsbury, W.C.1, from May 5th to July 5th. The arrangements for next week include

demonstrations in the out-patient department and wards on four afternoons, lectures on three afternoons, and surgical operations on Saturday morning.

THE President and Council of the Medical Society of London will be at home to members of the Fellowship of Medicine on Monday next, at 8.30 p.m., at the house of the Society, 11, Chandos Street, Cavendish Square, W.1. At 9 p.m. Sir StClair Thomson will give a short address, with epidiascope illustrations, on John Coakley Lettsom and the foundation of the Medical Society of London in 1773. Afterwards there will be refreshments and smoking. The Society will be pleased to welcome any members of the Overseas Forces now in London.

A SPECIAL meeting of the British Orthopaedic Association will be held at the Liverpool Medical Institution on Friday and Saturday, May 30th and 31st. On the first day a discussion on the treatment of flail joints of the upper limbs will be opened by Mr. Naughton Dunn and Mr. Harry Platt, and Professor F. Wood Jones will speak on the anatomy of snapping hip. Demonstrations will be given by Mr. A. Rocyn Jones and the President, Mr. E. Muirhead Little, and Mr. McCrae Aitken will speak on functions of scar tissue, Mr. Trethowan on the treatment of static disabilities of the feet, and Mr. Dunn on the operative treatment of paralytic talipes calcaneo-cavo-valgus. On Saturday demonstrations of patients and operations will be given at the Alder Hey Special Military Surgical Hospital in the morning, and a visit will be paid to the Liverpool Country Hospital for Children at Heswall.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

The postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2631, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

QUERIES AND ANSWERS.

S.H.B. asks for advice as to the most reliable sphygmomanometer which will stand the wear and tear of general practice.

DR. H. FERGIE WOODS (Golders Hill, N.W.3) writes in reply to "S. J. W.," who asks for advice as to treatment of incontinence of urine following a confinement: I would suggest trying *Arnica montana*, 5 drops of a 1 per cent. solution of the tincture taken internally in a little water night and morning for a couple of weeks will probably be found to relieve considerably, if not cure, the condition.

M.D., J.P. writes in answer to the question in last week's JOURNAL (p. 534): *The Justice of the Peace and his Functions on and off the Bench* (J. M. Dent and Sons) will supply your correspondent with all the information he requires in a plain untechnical way. A much larger work is *Stone's Justices' Manual*, published annually, of which a copy is kept in most police-courts. Experience, aided by the advice of the magistrates' clerk or the chief local police officer, will effect the new justice's fitness for his responsible duties.

INCOME TAX.

B. inquires whether sums paid by the Medical Sickness and Life Assurance Friendly Society during the illness of the recipient are liable to tax in his hands.

*** In our opinion, no. The payment of the "sickness" premiums is not a professional expense strictly, and the receipts are equally not received for professional work, and are therefore not "profits or gains" accruing from the profession.

V.A.D. inquires whether the special "service" rate of income tax applies to remuneration paid through the army paymaster for work in a local V.A.D. hospital.

*** The answer is in the negative. Red Cross work must be performed *abroad* to carry with it the right to the reduced scale of taxation, and as the remuneration is apparently received by our correspondent as a "temporary civilian employee of the War Office," and not as "army pay"—we assume that he is not liable to the ordinary army discipline—that ground of claim also fails.

LETTERS, NOTES, ETC.

PENSIONS FOR HOSPITAL OFFICERS.

SIR WILLIAM COLLINS has received the following letter in reference to his refusal to sign the report to the King's Hospital Fund which stated that a system of pensioning through resort to profit-earning insurance companies afforded the only solution of the problem. Sir William sent a dissentient memorandum setting out the conclusions at which he had arrived.

Seamen's Hospital, Greenwich,
15th April, 1919.

Dear Sir William Collins,

I would be unmindful of the obligation that every hospital employee is under to you for your attitude as a member of King Edward's Fund on the question of pensions were I not to write and acknowledge what you have done. The hospital official is not so well paid that he can afford a further tax on his limited remuneration, besides which the method of pensioning by the aid of insurance companies debars a hospital from augmenting a pension for particularly meritorious services as provided for in the Act of 1859.

As a secretary with almost the longest service of any other hospital official in London, I beg to thank you, on my own behalf and on behalf of my colleagues, for your signal service and sympathy.

Yours very truly,
P. Michelli, Secretary.

DISCHARGED TUBERCULOUS SOLDIERS.

THE Society of Medical Officers of Health recently pointed out to the Local Government Board that its circular of December 4th, 1918, in regard to the home visiting and after-care of discharged soldiers and sailors suffering from tuberculosis might be interpreted as making the tuberculosis officer directly responsible for measures in this connexion. In reply the Board stated that the circular "was not intended to suggest in any way that the tuberculosis officer should, except as far as his clinical duties are concerned, act otherwise than under the direction of the medical officer of health." The Board added that the position of the medical officer of health in relation to the administration of sanatorium benefit was stated in the third paragraph of their circular letter dated December 6th, 1912, as follows: "The organization of schemes must be undertaken as part of the public health administration of the areas to which they relate, and the medical officer of health should be the chief executive and organizing officer. . . ."

THE GRIEVANCES OF THE SPANISH MEDICAL PROFESSION.

THE indignation felt by the medical profession of Spain at the scurvy treatment they receive from public authorities has culminated in a general movement for redress. Meetings have been held throughout the country, and on March 19th King Alfonso gave an audience to the central executive committee of the Spanish medical associations deputed to lay before him the wrongs suffered by public health and poor law officers at the hands of municipal and other authorities. Special stress was laid on the meagreness of salaries and the lack of provision for the widows and orphans of the victims of professional duty in epidemics. Complaint was also made of the general neglect of medicinal and sanitary matters by the state. His Majesty gave the deputation a sympathetic hearing, listening to them for nearly an hour. He showed a full knowledge of the grievances of the profession, and promised that steps should be taken by the Government to satisfy its legitimate aspirations.

THE appointments of certifying factory surgeons in the following districts are vacant: Ballymacarberry (Waterford), Caerleon (Monmouth), Honiton (Devon).

THE following appointments of medical referee under the Workmen's Compensation Act, 1906, are vacant: Rotherham and Sheffield County Courts in Circuit No. 13; East Retford, Doncaster and Thorne County Courts in Circuit No. 18. Applications to the Private Secretary, Home Office, by May 21st.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Seven lines and under	0	6	0
Each additional line	0	0	9
Whole single column	4	0	0
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An average line contains six words.

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Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.